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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, JANUARY 1, 1881.

VOLUME XLII.  
Number 1.

## A Pulley Turning Lathe.

The engraving given herewith represents one of the Niles Tool Works Company's pulley turning lathe, a specimen of which can be seen at Parke & Lacy's, in this city. This one turns to 50 inches in diameter and 24-inch face, and will be found a most useful special tool in machine shops.

This lathe is designed solely for the purpose of turning pulleys, gears (either bevel, miter or spur), rolls, and works of this nature. It is an entirely new departure, and may be called a perfect illustration of "the means being adapted to the end." All other tools designed to do this work, follow in the old beaten track, with but slight modifications on which to base claims of superiority. This machine has novel and distinctive features that may be briefly recited as follows: A large cone pulley, with six steps for a belt four inches wide, transmits the power through tangent gearing, to the main spindle;

## California Weather.

The people in the Eastern States have been lately crowing and congratulating themselves on their business boom, and commiserating with us on our dull time. Now they have a cold weather boom, and the commiseration is on our side. At the same time, we can congratulate ourselves that that part of the boom is going to stay where it belongs—on the other side of the mountains. It is our turn to be thankful, and to be thankful for a good deal. The telegraph tells us of snow, ice, sleet, blockaded roads, frozen rivers, frozen people, shrinking thermometers and heavy storms. In New York heavy storms interfering with travel, and loss of property on the beaches; Washington and all the avenues blocked with snow, and Potomac frozen over; worst storm since 1857. Columbus, Georgia; Greenboro, N. C.; Shreveport, Montgomery, Ala.; Norfolk, Va.; Columbia, S. C.; Chicago, Buffalo, Boston—all wrapped up in

San Diego; 51° above; Sacramento, 50° above; Visalia, 48° above; Red Bluff 50° above.

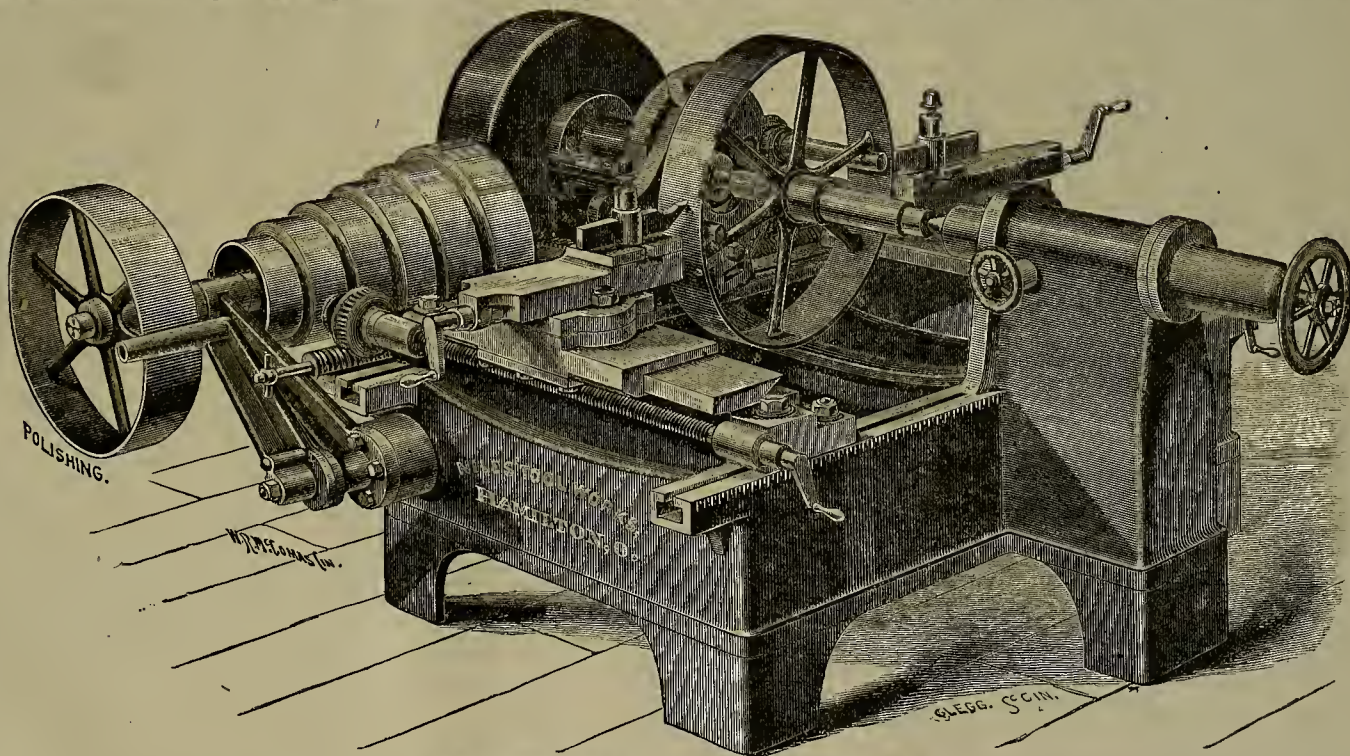
These figures speak volumes for the climate of this State. In this month of December the barometer varied very greatly. Between the 10th and 14th it fell from 30.445 to 29.486. On that day we had one inch and thirty-two hundredths between 1:30 and 8 P. M.

People who like a comfortable climate to live in, who don't care to sit by fires and wrap in furs and wool at all times, will still stick to California, even if there is a business boom in New York. They can make that but they can't make pleasant winters which are ready made for us here.

## Our Drift Mines.

To drift mining, a method by which hydraulic mining operations are sometimes very effectually supplemented, the remarks in an article on hydraulic mining last week may be largely applied; this branch of the business, like the others, having worked itself year

has been distinguished for its large profitable production; the East New York, which is now yielding liberally with heavy deposits of rich gravel opened up, and the Morgan claim, adjoining the Swamp Angel on the north, and in which the developments are represented to be first-class in every respect, if they lie not ahead of anything yet found on this ridge. This mine has also been explored and equipped in a very superior manner, having had the benefit of ample capital and an able management. The gravel in these mines yields from \$150 to \$300 per carload, a higher grade than the average throughout the State. At Forest City, Sierra county, the Bald Mountain mine maintains the forward position which it has for many years held as a drift enterprise, there being a number of other companies operating in that vicinity with an already achieved success, or prospects that may be considered equivalent to the same. The basin of Slate creek, lying a few miles farther to the northwest, is also the scene of many prosperous drift operations, of which latter there may also be counted not a few in Yuba, Butte and Plumas counties. In the northwestern



THE NILES SPECIAL PULLEY TURNING LATHE.

this is a steady and powerful method of driving, and is held in high estimation in England, where it has been tested through a range of work that demands the utmost steadiness, such as cylinder boring, etc. The carrier plate is of the equalizing type, obviating unequal and lateral strains. On each side of the solid bed piece is placed rests, which slide in and out on graduated surfaces to suit to the diameter of pulley to be turned; these rests can be set angularly to get any desired degree of "crown," tools are thus operated on both sides of the machine. The feeds are continuous, not intermittent. The feeds can be instantly engaged, disengaged or changed. Another feature of this tool is that the spindle of cone pulley runs at so much higher velocity than the main spindle, that its speed is suitable for polishing when the latter is turning; a steel mandrel and a suitable rest are provided for polishing, this arrangement secures a combination of machines. The countershaft has two pulleys 20 inches in diameter, 5½-inch face, which should run 130 revolutions per minute. Weight, 7,500 lbs.

The upper part of Montana is a very rich mining region, the mountains being full of iron, copper, lead, silver and gold, the latter being both in quartz and placer mines.

snow and ice. Some places with thermometer down to 30° below zero. Lots of places with thermometer at zero.

Here we are in San Francisco to-day (Thursday, Dec. 30th), with a warm sunshine, unclouded skies and pleasant weather. The thermometer to-day is 57° above. On the 24th, 25th and 26th we had the thermometer at 61° above zero. Think of that for Christmas temperature! These figures are for four o'clock in the morning, too, the coldest part of the day. We have had the thermometer up to 50° every day this month. The maximum range has been 51° to 61°, and the minimum range 56° to 42°. We had it down to 42° on one day, only. This for December!

Now note carefully the following figures for the 29th inst., Wednesday, at the time which corresponds to Washington time of seven A. M., which is about four A. M. here in San Francisco. On that day (29th), at Cheyenne, the thermometer was 13° below; Davenport, Iowa, 14° below; Des Moines, 17° below; North Platte, 23° below; Omaha, 13° below. The dispatches tell us of other places 15°, and 20°, and 25° below.

On our coast on that date (Wednesday), in San Francisco, at the hour named, the thermometer registered 53° above; Los Angeles, 49° above;

by year into a better position, its present status hardly suffering by comparison with any kind of mining extant. While drift mining is, to some extent, practiced wherever placer deposits abound, still in only a few localities do we find it prosecuted with system, and by methods that involve the employment of much engineering skill and necessitate expenditure of large sums of money. The following may be accounted the sites of its greatest activity and largest success in this State; where the business is carried on upon a scale not even approximated in any other part of the country: On the Forest Hill divide, Placer county, where the most noted mines consist of the Weske claim, near Michigan Bluff; the Hidden Treasure, at Sunny South; the Mountain Gate, at Damascus; the Bruce & Wheeler, at Bath, and the Dardenelles, lying near the town of Forest Hill. The Sunny South Co. extracted from their claim, last year, \$98,000 in gold dust, of which \$37,000 were paid, in the shape of dividends, to the owners; this being about the average rate of production made by the leading companies on this divide.

The ridge that separates Bear river from Steep hollow in the same county constitutes another noted drift locality, the prominent mines here being the Swamp Angel, which for several years

group of counties, before alluded to, much gold is taken out by the drift method, though the claims there are for the most part worked only in a small way. Drift mining, though it yields hardly more than a third or a fourth as much gold as is taken out by the hydraulic process, possesses some advantages over the latter in that it calls for less capital, and can be more generally engaged in. In short, the requirements necessary to success are, as a general thing, more easily met in this than in the hydraulic department of the business.

A REMARKABLY good sample of a paper that gives full justice to the specialty to which it is devoted, is the *Paper World*, a journal of information, discussion and recital as to paper, conducted by Clark W. Bryan, at Holyoke, Mass. Late copies of this monthly are replete with information about paper, interesting to users as well as manufacturers of that much used article.

SALT LAKE is supplying the mills and smelters of Idaho and Montana with salt, and that necessary commodity is costing during the present condition of the roads, from \$30 to \$40 per ton.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Ede;

### Glacial Observations in the Wind River Mountains.

(Written for the Press by CHARLES F. BLACKBURN.)

Much has been written of late years by various physicists about the geology and natural history of this noble range. The object of this letter is to give some information regarding the very interesting glacial region which occurs along the summit of these mountains.

During the months of August and September last, the writer, accompanied by Messrs. Johnson and Menefee, were engaged in investigating the glacial, geological and physical phenomena of the range; with, however, the objective purpose of determining the metallic wealth of the region. So, as my work lacked much of gathering full data of the glaciers, and, moreover, as this communication will give only a resume taken from my itinerary, I am fully aware of the fact that the description may lack much in giving important details, which are inevitably omitted.

For the topographical features of the region, I take the liberty to refer the reader to the excellent maps of Dr. F. V. Hayden. Along the summit of the Wind River range, between Wind River peak and the head of Tory creek, occurs a very interesting and

#### Extensive Glacial Field.

This important region has the venerable Fremont's peak for its keystone center. Living glaciers exist in the immediate vicinity, while others of considerable magnitude occur for a distance of 30 miles each way from Fremont along the trend of the range.

The writer ascended four of the higher summit peaks; also others that seem to vie with those that divide the continental waters, around all of which glaciers (some living) were observed. The great center, however, is in the immediate vicinity of Fremont's peak, the trend of range being north 45° west. Altitude of the summit peaks varying, according to Dr. Hayden, from 13,400 to 13,790 ft.; the former being the elevation of Wind River and the latter that of Fremont's peak. My own observations give higher elevations to all of these points—e. g., I found Fremont's peak to be 14,500 ft. However, as my estimates were taken with aneroid alone, I concede my results as merely approximations, and will not question the decision, but rather accept the determinations of Dr. Hayden as competent authority, unless proved erroneous by future investigations.

The latitude of this glacial region includes about 1° lying between 42° 45' and 43° 45' north; longitude, between 109° and 110° west. Along the northeast base of Fremont's peak occurs the great

#### Ice Sheet,

Extending for fully 20 miles, and lacking only a few rods at places of being contiguous throughout. At the heads of all the canyons the depressions may be observed heaped up with these dynamical frozen giants. From the foot of the glaciers to the base of the range occur profound gorges, over the surface of which exists *roches moutonnées*, lateral and terminal moraines, and many beautiful perpetual frozen lakes, over which the writer walked in August. Some of these

#### Remarkable Lakes

Were really frozen solid; no water being visible. The depth of the glaciers about the northeast base of Fremont's peak are evidently from 50 to 500 ft.; width, varying from one-half to two miles; length, from one to four miles. Many were observed to be moving, but, as usual, at a very slow rate. Another very interesting phenomena, regarding the glaciers of this region, is the profound attrition and erosion wrought by those that have long since vanished. Those yet lingering on these Alpine heights are mere pigmies, merely remnants of former greatness. It is very easy for the geologist to read their awe-inspiring records, while meandering over these frozen and solitary heights. Their history is legible in hold relief. The hot-toms of these glacial canyons are composed principally of groups of *roches moutonnées*, granite and gneiss hummocks, retaining their myriads of grooves and scorings. While often these crystalline tops present a beautiful polish, all done by the moving, but now vanished, mountain of ice.

Agassiz's fondlings (glaciated boulders) were observed all around the range, often several miles from its base. Large terminal moraines occur along the base, between Buffalo lake and Tory creek, especially in the vicinity of Dinwiddie creek. Also about the head of the latter stream the largest living glaciers may be observed, that exist in the Wind River mountains. While investigating the

#### Orological Phenomena

Of this great range, the mind is almost bewildered in grasping, or comprehending, the magnitude of causes and effects that lie before his vision. Chemical and mechanical denudation has wrought such profound topographical changes in the contour of the range, that its present

orographical relief seems almost incredible; Alpine heights and isolated pinacles—awe-inspiring—wearing their blue glacial gems in majestic silence; huge blocks of granite and gneiss, hills in themselves, occur on all sides, while deep chasms exist, filled with snow and ice which never melt.

Great amphitheaters, or horseshoe-like canyons, occur about Fremont's peak—vertical walls standing more than 2,000 ft. high—while, looming still above these, occur rugged crags, or granite domes, from which magnificent views of the surrounding country may be had. From these dizzy heights the observer may look over thousands of square miles, many of which show true rugged grandeur. So intense is the sublimity that pervades the noble sights from these lofty points that the observer becomes lost at his own insignificance, and hardly ventures a conception of his greatness to be more than "simply a terrestrial parasite." Lowering the eyes he meets the great organic records; the fossiliferous tomb, or Nature's profound hook of evolution. Beginning with the primordial and glancing through the series to the quaternary, the observer is again lost in trying to grasp, or comprehend, the great antiquity of this great natural hook (the only true history of creation), and for a consolation he can truly congratulate himself on being so fortunate as to be classed with the humble *genus homo*, and allowed the blessed privilege to live in the glorious circle of scientific light.

As I have previously said, my description regarding the glaciers would not give any details, it gives me much pleasure to announce to scientific men that such a region does exist in our country, and to those who wish to become acquainted with glacial phenomena need not go to the far-away Alps to acquire his information.

Lander, Wyoming Territory, Dec. 15, 1880.

### Simple Mining Laws.

EDITORS PRESS:—I concur in the views expressed in your issue of the PRESS hearing the date of Dec. 18, 1880, that our mining laws should be so simple that any miner could construe them without doubt, and the simpler the mining code of the country the better. If you are correct—and I do not doubt it—that Senator Teller proposes amendments to our mining statutes, one of which is that 1,500 linear ft. shall be the limit of a location in length, on lodes or veins, by any one, or more persons, and 300 ft. the limit in width on each side of the surface projection of the lode—such an amendment, it would appear to me, would be entirely useless, for the mining statute of May 10, 1872, Section 2, contains the following language which can be susceptible of but one construction: "A mining claim located after the passage of this act, whether located by one or more persons, may equal, but shall not exceed 1,500 ft. in length along the vein or lode. No claim shall extend more than 300 ft. on each side of the middle of the vein at the surface," etc. Does it not appear evident then, that our mining statute does not need amending in that particular? There is, however, an amendment needed to our mining laws, and I deem it a very important one. In the act of May 10, 1872, we find the following language: "On each claim located after the passage of this act, and until a patent shall have been issued therefor, not less than \$100 worth of labor shall be performed, or improvements made during each year." It would seem that this language is plain enough, and meant all that is expressed in it, viz., that every mining claim should have annually expended upon it \$100 worth of labor or improvements. It does not mean anything of the sort. No sir! It is true it says that clearly, plainly, emphatically; but consult any lawyer, and he will tell you that it refers to lode claims alone; that it is, and has been long settled in our courts, that it refers to lode claims only. I hold differently. Take the whole of the act together, the intention and meaning of it was to apply to all mines. "The miners of each mining district may make rules and regulations not in conflict with the laws of the United States governing the location, manner of recording and amount of work necessary to hold possession of the mining claim," etc. Why should not that part of the act, with equal force, apply to lodes and veins only? The language is in the same Section of the act. Yet our courts hold that this last applies to all mining claims, while the first applies only to quartz claims. Higher authority still, no less than the Hon. Commissioner of the General Land Office, interprets the language of the act as our courts do. The necessity of amending the act of May 10, 1872, so that its language and intent cannot be mistaken, lies in the fact that any man, or company of men, may go upon and locate 20, or 160 acres of placer mining ground, and the law—outside of a mining district—is silent as to what shall be done in the way of labor or improvements to hold the claim. Years subsequent to a location of a placer mine, under the operations of the act of May, 1872, some miner discovers a good mine, and proceeds to develop it, expending in the prosecution of such development thousands of dollars. Just at the point where he has begun to realize and make it pay, the original locator sets up his claim to the ground, and under the construction of that act by our courts, the mine is awarded to him. Here a great injustice is done unintentionally by a law that was designed and formed for the purpose of protecting miners and mining interests. I could call your attention

to thousands of acres of mining ground in this State, held by no other title than the above; but my letter is already too long, and I will close for the present. THOS. W. REECE, Oroville, Butte Co., Cal.

### A Rare Coleopterous Insect.

At the regular meeting of the Arthrozoic Club of this city, held this week, L. Edgar Ricksecker read a paper describing a very rare specimen of coleopterous insect. He said: I have the pleasure of exhibiting to you to-night a specimen of great rarity and exquisite beauty. It is the coleopteran *Plusiotis gloriosa*, Lec., which was procured for me lately by a friend traveling through the mining regions of Arizona. The genus *Plusiotis* belongs, according to Dr. Le Conte's classification, to the *Scarabaeidae pleu. rosticti*, which is the third division of the family, *Scarabaeidae*. It is purely American, five of its seven described species being found in Mexico, one in Chile, and this one in Arizona, and possibly as far west as San Diego, Cal.

It is nearly allied to the genus *Pelidnota*, of which the common grapevine beetle, *Pelidnota punctata*, Linn., of the Atlantic States, is the well-known representative; and in the same group with *Pelidnota* and *Plusiotis* is the genus *Cotalpa*, to which belongs the familiar *Cotalpa lanigera*, of a golden yellow color, and the hairy *Cotalpa granicollis*, the latter being found in Utah and as far north as eastern Washington Territory—possibly also in California.

All the species of this group are handsome insects; but this one, with its broad stripes and margins of polished gold, not only outshines all its near relations, but, in the language of Dr. Le Conte, "is the most beautiful coleopterous insect known." Many tropical species are more grotesque in form, more conspicuous in size, more gaudy in color, but in its exquisite neatness and brilliancy, *Plusiotis gloriosa* is not surpassed by any.

In size, this specimen is 27 m. m. (or a little more than an inch) in length, and 14 m. m. in breadth. Its form is more elongate and more convex than either *Cotalpa* or *Pelidnota*. The antennae are 10-jointed; the legs strong and massive, with the tarsal claws—like all the species of this tribe—of unequal lengths. The color, above, is a delicate, pale green. The thorax has a smooth, shining appearance, but under the lens shows fine, shallow punctures; its narrow, reflexed margin is banded by a continuous fillet of gold  $\frac{1}{2}$  m. m. in width. The head is of the same green color, rather rougher than the thorax. The eye large and black, with an occipital band of dull gold color connecting them. The elytra are striated with three broad stripes on each elytron, and a narrower, more imperfect one near the outer margin, each of these being rendered conspicuous by a smooth lining of pure, burnished gold. On the ridges between the striae are rows of fine punctures and specks of gold. Near the outer margins are two rows of fine punctures, and the margin itself is moderately reflexed and banded with gold. On each shoulder is a minute black dot. Beneath the head and thorax are of a brilliant gold color, running to green in the middle of the body. The legs and abdominal rings are green, banded with gold. All the under parts are more or less fringed with fine white hairs.

Of the life-history of this insect nothing is known; but we may well infer that it is similar to that of *Pelidnota* and other species of this group. They are leaf-eaters. The larvae subsist on decayed wood and vegetable matter, often remaining in the soil for several years before undergoing their final metamorphosis. *Pelidnota* lives on the grapevine; *Cotalpa*, if I remember correctly, on the willow;—*Plusiotis* is so rare that I doubt if its favorite food plant has ever been observed. The person from whom this specimen was obtained, informed me that but three had ever been found in that neighborhood. However, as this was at an altitude of perhaps 4,000 ft. above the sea, I doubt whether that particular locality can be considered as a part of its regular habitat. I think the valley of the Gila river is its most natural home. Here, under the all-pervading influence of a blazing, almost tropical sun, reared in the rich, metalliferous soil for which southern Arizona is famous, is brought forth the golden luster of this superb beetle.

Many species of the sub-family show a strong tendency to take on metallic hues. In this instance the combined influences of the intense solar heat, and the auriferous and argentiferous nature of the soil in which the larvae dig, and delves for its food, seems to augment this tendency to such a degree as to produce the brilliant result which we see in *Plusiotis gloriosa*.

The Harshaw mining company, of Arizona, is running 20 stamps night and day and is producing from \$100,000 to \$130,000 per month. No dividends have yet been paid.

The Osceola Con. Copper mining company, of Michigan, has declared a dividend of \$1.50 per share, aggregating \$75,000, payable in New York on the 2d of January.

The members of the U. S. Geological Survey who have for 16 months been at work in the vicinity of Eureka, Nevada, have finished their surveying work.

### Academy of Sciences.

Want of space in our last week's issue prevented our giving a report of this meeting of the California Academy of Sciences, which was held on the 20th ult. Prof. Davidson presided and a number of donations were made. The committee appointed to nominate a regular ticket for officers for the coming year reported in favor of the old officers as follows: President, George Davidson; First Vice-President, Justin P. Moore; Second Vice-President, Dr. Herman Behr; Recording Secretary, Charles G. Yale; Corresponding Secretary, S. B. Christy; Treasurer, Elisha Brooks; Librarian, Chas. T. Meyer; Director of Museum, W. G. W. Harford; Trustees, Wm. Ashburner, Col. George E. Gray, Robert E. C. Stearns, B. B. Redding, Thos. P. Madden, Ralph C. Harrison and J. M. McDonald.

Mr. C. D. Gibbs, who presented the Academy with a very valuable set of geological specimens, some 200 in number, read a paper on "The Geological Specimens Collected in San Francisco and Vicinity." This paper we give in another column.

#### Aleutian Mummies.

An interesting paper was then read, entitled "Contributions to the History of the Aleutian Isles," prepared by Dr. Arthur B. Stout, Curator of the Department of Comparative Anatomy, to whom was referred for investigation the two mummies presented to the Academy in 1874 by the Alaska Commercial Co., who received them in response to their instructions to their agents to collect and forward all material for scientific purposes, to be placed in scientific museums here and at the East. These mummies came from the Island of Kagamil, one of the group known as the Four Mountains, or craters. The island contains active volcanoes, and is not now inhabited. In the immediate vicinity of the cave from which these mummies were taken, etiam continually arises from a colfatar, and the soil is warm to the touch. Traditions place their age about the year 1756, or when Russians were first seen by the natives. They possess great interest as containing relics indicating the pursuits and handicraft of the Inuits before they were modified by the introduction of any adjuncts of civilization. No implements whatever were found about them. One was that of a woman, the other a man 5 ft. 11 inches high. The wrappings next the bodies were of sealskin. The crania were found entirely empty, and no traces of the viscera remained. The limbs were carefully folded against the body, apparently to make the embalmed package as tight and small as possible. The work is done with evident care and solicitude.

#### The Hurricane at Sitka.

A paper by Commander Henry Glass, of the U. S. S. *Jamestown*, now at Sitka, was read by Mr. Brooke. The hurricane took place October 20th, 1880. Careful observations were made on board the *Jamestown* every 10 minutes, of the height of the barometric temperature of the air, force and direction of the wind, and forms and general movement of the clouds. At 10 h. 35 m., October 25th, the barometer stood at 28.20, the wind blowing in terrific squalls, accompanied by rain. The wind marked 11 to 12, in the Beaufort system of notation. The temperature of the air fell from 53° to 44° Fahr. The first indications of the gale were noted October 23d, from which time the barometer gradually fell. The rotary column of the hurricane advanced at the rate of five to six miles per hour, and its course was determined by the configuration of the high land, the storm extending only 1,000 ft. high, to which height trees on the hillsides were prostrated, and above which they escaped injury. A heavy shock of earthquake occurred, as the storm-center passed over the southern flank of Mount Edgecumbe, an apparently extinct volcano, whose ancient crater was then exposed to the area of lowest barometrical pressure. Commander Glass inquires, did the sudden removal of an enormous atmospheric pressure over the crater of a recent volcano offer sufficient cause to account for the shock of earthquake noted simultaneously with the lowest barometrical observation? He thinks there was something more than a mere coincidence in this awakening of seismic activity. Several shocks succeeded, gradually decreasing in severity, in close correspondence with the rise of the barometer to its normal height in that latitude. Reports from the interior prove beyond question that Mt. Edgecumbe was the center of oscillation, decreasing in severity as their distance from Sitka increased. He concluded by requesting the Academy to scientifically investigate the important question of the relation of hurricanes and earthquakes, as indicated by their coincidence with areas of low barometrical pressure, or high electric tension.

Mr. B. B. Redding read a very valuable and interesting paper on "The Future of Fish Culture." This paper will shortly be published in full.

The Evening Star mining company, of Colorado, paid a dividend of five cents per share, aggregating \$25,000, at New York on the 10th. This makes \$100,000 paid by this company to date.

THOMAS H. FLETCHER, a resident of Sierra county since 1850, died last week. He was at one time Supt. of the Gold Bluff mine.



## MECHANICAL PROGRESS.

## The Roberts Locomotive.

Col. E. A. L. Roberts, of Titusville, has made a contract with the Baldwin Locomotive Works to build a passenger engine which he expects will be able to run 80 miles an hour, and maintain this rate of speed for 100 miles without stopping. The locomotive is to weigh 38 tons. The driving wheels will be six ft. in diameter. The forward trucks and those on the tender will be made of paper, which it is said will endure more strain and wear than iron or steel. The most important features of the locomotive will be the introduction of the Roberts patent cylinder and piston, the exhaust parts being in a continuous circle around the cylinder. The tender will be so constructed as to carry a foot of water under the coal, as well as the usual amount on the sides. There will be a water chamber on the locomotive so arranged that compressed air from the air pump can be admitted in the top of the chamber upon the water, by which means a stream may be forced upon any hot bearing connected with the engine or tender. This is expected to overcome the trouble of hot boxes. The nozzles through which the steam is to pass and create a draft will be eight inches in diameter, and the boiler will be the largest that can be put upon the standard gauge trucks. Col. Roberts, the inventor, says that he built a similar locomotive a few years ago which drew the fast mail train over a portion of the Lake Shore railway, but it was not a success, owing to its poor construction. The improvements it suggested will be taken advantage of in building the new engine.

**STEEL AS A STRUCTURAL MATERIAL.**—At a recent meeting of the Society of Engineers, Paris, a paper, entitled "Modern Steels as Structural Materials," was read by Mr. W. W. Beaumont, C. E., the object of which was to call attention to the structural inferiority of the modern very soft steel as compared with the structural value which steel made by the Bessemer and other processes promised to possess ten years or so ago. At that time the high tenacity of steel then being produced seemed to indicate that it would afford engineers considerable facility for building lighter structures than was possible with iron. Attempts to employ this steel for bridge and boiler work, however, showed that it was necessary to impart greater toughness to it, and since that time steel manufacturers had labored to effect this by producing very soft and ductile steels. If necessarily accompanied by a low elastic limit it involved a loss in efficiency. It thus appeared that constructors were in danger of losing all the advantages which the application of steel to structural purposes promised a dozen years ago to secure, although steel may now be obtained of greater uniformity and trustworthiness than was possible at that time.

**CARBON IN STEEL.—BURNED STEEL.**—Prof. Leeds has found that the amount of carbon in a piece of steel which had been purposely burned, was the same as in a similar piece which had not been burned; the burning, however, was of the steel itself, which contained a large amount of the oxide of iron, that is, the metal instead of the carbon burned. The heat, he says, does not harm steel or iron, and consequently they may be heated and cooled an unlimited number of times, provided they are not brought in contact with the air and so take up oxygen. In heating a piece of steel, the amount of blast has more to do with the burning than the heat; and if the extra amount of oxygen which a burnt piece of steel has taken up is taken out of it, it can be made to work just as well as it did before. The proof that the heat does not harm the steel is found in the fact that if the steel is put in a closed box, and luted up so as to keep out the air, it can be heated and cooled an unlimited number of times without injury.

**CRANK PINS.**—There are few things more troublesome to an engineer than a hot crank pin, and it is sometimes very difficult to get at the real reason why it heats. Among the principal reasons for heating are: The mainshaft is not "square" with the engine, or, that the pin is not properly fitted to the crank, or perhaps it is too small in diameter; defects which are to be remedied as soon as practicable. Heating is often caused by the boxes being keyed too tightly, or by insufficient lubrication. There are now several good self-feeding lubricators in the market which will supply the oil to a crank pin continuously; these are recommended rather than the old style of oil cup, which was not only uncertain, but doubtful in its action.—*The Indicator.*

**STRENGTH OF IRON CHAINS FOR BRIDGES.**—Prof. Banschinger has lately tested some iron taken from a chain bridge built in 1829, and found that after 50 years of service its strength and elasticity had not altered perceptibly from what they were reported to be at the time they were put into service. The fact that age has little effect on the quality of iron, is likewise verified by the result of tests made by Prof. Thurston of pieces of wire cable of the historic Fairmount suspension bridge at Philadelphia, lately taken down after 40 years of service. The tested pieces were found to have a tenacity, elasticity and ductility fully equal to the best wire of the same size found in the market to-day.

## Hardening and Testing.

To really test the hardness of the surface of metal, we must take a new, or at least a good, dead smooth file, and apply one corner of it to a corner rather than on a flat surface of the metal to be tested, pressing the file very firmly against the work. A coarse file, even if a new one, is useless to test with. The greatest degree of hardness is obtained by plunging the red-hot steel into mercury. Steel hardened from the surface inward is hardest on the surface, while in steel that has been tempered the exterior is the softest. In the one case, because the surface was cooled in advance; in the other, because it was heated in advance. Files are hardened in the following mixture: Two parts (by weight) of salt, 15 of rye grit and 30 of burnt cow hoofs, all ground together and mixed with a sufficient quantity of water to make a pasty mass, with which the files are covered. When dry they are placed in a fire. If, during the heating, the coating should drop off at certain places, the files are promptly withdrawn and the place exposed is covered with dry roof powder. It is returned to the fire, where it is left until a temperature is reached which best suits the steel of which the file is made. Then it is plunged vertically into the bath, care being taken not to move it to the right or left, as that would cause warping. The bath is made in the following manner: 23 parts of salt are dissolved in about 5 parts of water, to which a handful of iron scale is added. The tangs are softened by being plunged into red-hot lead.—*Manufacturer and Builder.*

**UNIFORM MOTION.**—It is always desirable that the motion of a machine should be regular. Even supposing that the first mover is perfectly constant and equable in its action, the machine may not be regular in its movement, from the irregularity of the resistance to be overcome. But still, if both the power and the resistance were perfectly regular, the machine would not be perfectly uniform in its motion, for there are particular positions in which the moving parts of a machine are more efficacious than others, as in the crank, for instance; hence, the energy of the first mover will be unequally transmitted, and irregularity in the motion of the machine will consequently follow. The motion of some machines bears a constant tendency to accelerate and retard, and others alternately to accelerate and retard; and, perhaps, in no case whatever can the motion of a machine be said to be perfectly uniform, but common sense will point out the necessity of having the motion as uniform as it can be made, else it will increase in proportion as it is multiplied through the machinery.—*Ec.*

That wonderful locomotive, built at Paterson, N. J., for an inventor, who, in his design turned the ordinary locomotive topsy-turvy and imparted power to the driving-wheels by friction, has been tried, and is said to have given remarkably good results in drawing heavy loads up grade, but it has not yet been tested for speed. On an up grade of about 12½ ft. to the mile, the engine pulled 21 cars weighing over 474 tons, with such ease that more cars were added to the train in successive experiments, until finally 39 loaded cars, weighing 862 tons, were pulled over the same grade with from 135 to 140 lbs. of steam. In this engine the cylinder and the moving parts are above the boiler, so as to permit the use of double drivers, one set above the other, so proportioned as to give great speed to the driver, resting on the track, and to which power is imparted by friction.

**THE WELDING QUALITIES OF MILD STEEL.**—The manufacture of mild steel is not yet sufficiently well understood for it to displace the higher qualities of wrought iron, inasmuch as it will not weld, and the causes have not yet been ascertained why some bars of mild steel will weld and some will not. Till more light is thrown on this subject, and till all bars put into an ordinary blacksmith's hands will weld with certainty, says Mr. E. Windsor Richards, so long will good wrought iron hold its own; "but I have no doubt in my own mind that not many years will pass away before this problem is satisfactorily solved. Some very mild basic steel has been made sufficiently soft to weld, but it requires a much higher heat than iron. This is easily understood; every blacksmith knows that the better quality of the material the higher heat it will bear."

**A NEW SHIP BERTH.**—An English inventor has patented a new ship berth, having for its design the avoidance of sea sickness. The principle on which this berth is built is that of balance upon the universal joint, in such a manner that the weight of the person reclining upon the berth causes it to maintain a uniform and perfectly level surface, no matter how much the ship may pitch or roll; besides this, the berth is further controlled by means of strong india-rubber bands, fixed at each side, to prevent the possibility of its springing up in sudden jerks. The principle of an automatic self-leveling ship's berth seems good, and we have no doubt that such a berth might lessen the immediate effects of the movements of the ship upon those who suffer from sea sickness.

**AN ECONOMICAL PUMP.**—The Boston *Journal of Commerce* computes, from somewhat imperfect data, that the engine built by Corlies for the Boston Committee of Improved Sewerage, showed a duty of 128,398,309 ft. lbs. with 100 lbs. of coal.

## SCIENTIFIC PROGRESS.

## Opposition to the Metric System.

A few years ago it seemed as if the advocates of the metric system of weights and measures were having things all their own way in the learned societies and in the public print. Now it looks as if the tides were turning against them. At the first annual meeting of the American Society of Mechanical Engineers, recently held in New York, Mr. Coleman Sellers, of the well known firm of Sellers & Co., read a paper on the use of the metric system in the workshop, in which he stated that after his firm had had 20 years of actual experience with it in their shop, they had found it less convenient and in every way less adapted to their needs than the old system.

They built a shop for the manufacture of the Giffard injector, and every drawing and every scale template and gauge for these injectors has been for 20 years made on the metric system, and yet after all this experience he is convinced the metric system is not adapted to our use. Some theorists urge its adoption throughout the entire world; others wish its use prohibited. There is not one lathe in the world, not even in France, ruled by the metric system. It is not practical in drawing, neither can it be conveniently used in the machine shop. Our own system is by far superior to the metric system. Therefore let us hold fast to that which is good.

Mr. Sellers makes use of the following language: "As an engineer I can see no possible good to come to American machinists from the change. Its introduction exclusively would not diminish his labor in any way; it would not cheapen his product, it would increase its cost. It is in fact, however, so impossible, in view of existing matters, and existing harmony in interchangeable matter, that should the metric standard be made the only legal standard in America to be used in buying or selling, the engineering establishments now in existence could not heed the law, but must perforce use their existing tools and gauges of precision, and continue to make material in conformity with existing matter."

To show that Mr. Sellers is far from being alone in his opposition to the metric system, we take the following from a report of the meeting:

Mr. Henry R. Worthington asked leave to offer a resolution. For the first time he found himself in the presence of a body which he considered competent to speak for the mechanical engineers of the country. He looked upon the utterances of those who, pretending to speak for the mechanical profession, had favored the legalizing of the metric system, as a gratuitous impertinence, and he should much like to hear an expression of the views of the meeting on the subject. His resolution was as follows:

*Resolved,* That this society deprecates any legislation tending to make the adoption of the metric system of measures obligatory in our industrial establishments; also,

*Resolved,* That the Secretary be instructed to communicate the sentiments of this resolution to all concerned in procuring such legislation, and also to send a copy to the Anti-Metric Society of Cleveland.

It was evident that the sympathy of the audience was strongly in favor of this resolution, and that a majority of those present were eager to give expression to their opposition to the metric system. However, it was finally decided that, as the resolution committed the society to an expression of views, it should be voted upon by a letter ballot.

## To Protect Lead against Corrosion.

Prof. Emerson Reynolds describes a process for the protection of lead against corrosion, which is done by coating it with a film of sulphide of lead. He recommends the following method: Take 16 grams of solid caustic soda, dissolve it in 1.75 liters of water, and add to the liquid 17 grams of nitrate of lead, or an equivalent of other lead salt, with 250 cubic centimeters of water; raise the temperature of the mixture to 90° C. If sufficient lead salt has been added the liquid will remain somewhat turbid after heating, and must then be rapidly strained or filtered through asbestos, glass-wool or other suitable material, into a convenient vessel. The filtered liquid is then well mixed with 100 cubic centimeters of hot water, containing in solution 4 grams of sulpho urea or thio-carbamide. If the temperature of the mixture be maintained at about 70° C., deposition of sulphide of lead or galena, in the form of a fine adherent film or layer, quickly takes place on any object immersed in or covered with the liquid, provided the object be in a perfectly clean condition and suitable for the purpose. When the operation is properly conducted a layer of galena is obtained which is so strongly adherent that it can be easily polished by means of the usual leather polisher. It is not necessary to deposit the galena from hot liquids, but the deposition is more rapid than from cold solutions.

**OLD MEN AS SCIENTISTS.**—Recently Prof. Huxley said that 99 men out of every 100 became simply obstructive after 60 years old, and were not flexible enough to yield to the advance of new ideas. The world, he thought, would be benefited by any man who had taken part in science, being strangled after 60.

## Duration of the Arctic Winter.

Lieut. Schwatka, the Arctic explorer, gives some interesting facts in regard to the character and duration of the Arctic winter. He says:

"The generally received opinion that the Arctic winter, especially in the higher latitudes, is a long, dreary one of perfect opaque darkness, is not strictly correct. In latitude 83° 20' 20" N., the highest point ever reached by man, there are 4 hours and 42 minutes of twilight on December 22nd, the shortest day in the year in the Northern Hemisphere. In latitude 82° 27' N., the highest point where white men have wintered, there are 6 hours and 2 minutes in the shortest day, and 323 geographical miles from that point must yet be attained before the true Plutonic zone, or that one in which there is no twilight whatsoever, even upon the shortest day of the year, can be said to have been entered by man. Of course, about the beginning and ending of this twilight, it is very feeble and easily extinguished by even the slightest mists; but, nevertheless, it exists, and is very appreciable on clear, cold days, or nights, properly speaking. The North Pole itself is only shrouded in perfect blackness from November 13th to January 29th, a period of 77 days. Supposing that the sun has set (supposing a circumpolar sea or body of water unlimited to vision) on September 24th, not to rise until March 18th for that particular point, giving a period of about 50 days, of uniformly varying twilight, the Pole has about 188 days of continuous daylight, 100 days of varying twilight and 77 of perfect inky darkness (save when the moon has a northern declination) in the period of a typical year. During the period of a little over four days the sun shines continuously on both the North and South Poles at the same time, owing to refraction parallax, semi-diameter and dip of the horizon."

**ANTHROPOLOGICAL SOCIETY.**—On February 10, 1879, a few gentlemen interested in the study of man met in the Smithsonian Institution to devise a method of mutual improvement. The effort resulted in the formation of the Anthropological Society of Washington, with Major Powell for president, and Dr. Reynolds and Prof. O. T. Mason as recording and corresponding secretaries. Twenty-four papers have been read, which, if one might judge from their titles, are most interesting and valuable contributions. We learn from the *American Naturalist* that it is not yet decided whether a journal will be published, inasmuch as the Smithsonian Institution and the Bureau of Ethnology "afford ample opportunities of preserving all papers of permanent value." Without doubting this fact, we still hope that this young and vigorous society may not only have its own publication, but also that a long career of activity may ensue to provide the material for filling the pages of the same.

**PROF. BELL IN PARIS.**—It appears that the address which, as we have already noticed in these columns, Prof. Bell was to deliver before the Society of Arts, in Paris, on his new discoveries in regard to the transmission of sound by rays of light, attracted an unusual share of attention. Large numbers were unable to gain admission, for which reason arrangements were made to have it repeated by another gentleman, as the Professor's engagements were such that he could not get the time to deliver it again himself. It is remarked of this, by a French journal, that, "unlike many discoveries, the telephone was not the subject of a patent. Practical electricians had been compelled by Prof. Bell's previous discoveries, to study the science of sound, and would now have also to take up that of sight. Prof. Bell had again opened out to the physicist new ground where everything that was delightful was to be investigated."

**CURIOUS EXPERIMENT IN MAGNETISM.**—The following experiment is described by M. Obalski, in a communication to the Académie des Sciences: Two magnetic needles are hung vertically by fine thread, their unlike poles being opposite one another. Below them is a vessel containing water, its surface not quite touching the needles. They are hung so far apart as not to move toward one another. The level of the water is now quietly raised by letting a further quantity flow in from below. As soon as the water covers the lower ends of the needles they begin to approach one another, and when they are nearly immersed they rush together. The effect appears to be due to the fact that when the gravitation force downwards is partly counteracted by the upward hydrostatic force, due to immersion, the magnetic force, being relatively greater, is able to assert itself.

**THE FUEL OF THE FUTURE.**—It is claimed in many quarters that petroleum is to be the fuel of the near future; the difficulty of controlling its intense heat has been found to be serious, as a petroleum flame impinging on iron soon causes it to weaken. Dr. Durvee has apparently overcome this in his blow-pipe principle, where he forces a mixed air and oil blast through a central flue of a long cylinder boiler. As the gases are mixed in a fire brick furnace before entering the boiler, the danger of burning the iron is obviated. Wonderful results are predicted from this, as it is claimed that a flame 40 ft. long through an eight-inch flue will afford about a hundred horse-power at a cost of five gallons of oil per hour.



Table of Highest and Lowest Sales in  
S. F. Stock Exchange.

Name of Company.	Week Ending Dec. 9.	Week Ending Dec. 16.	Week Ending Dec. 23.	Week Ending Dec. 30.
Alpha.....	5	41	4	31
Alta.....	20	81	84	4.85
Andes.....	3	12	2.40	1.90
Alps.....	20c	10c	45c	15c
Argenta.....	20c	10c	45c	15c
Atlantic.....	20c	10c	45c	15c
Aurora Tunnel.....	20c	10c	45c	15c
Baltimore Con.....	20c	10c	45c	15c
Belcher.....	20c	10c	45c	15c
Belmont.....	20c	10c	45c	15c
Best & Belcher.....	20c	10c	45c	15c
Bullion.....	20c	10c	45c	15c
Buchanan.....	20c	10c	45c	15c
Belle Isle.....	20c	10c	45c	15c
Benton.....	20c	10c	45c	15c
Bulwer.....	20c	10c	45c	15c
Boyle.....	20c	10c	45c	15c
Black Hawk.....	20c	10c	45c	15c
Belvidere.....	20c	10c	45c	15c
Booker.....	20c	10c	45c	15c
Caledonia.....	20c	10c	45c	15c
California.....	20c	10c	45c	15c
Challenger.....	20c	10c	45c	15c
Chollar.....	20c	10c	45c	15c
Confidence.....	20c	10c	45c	15c
Con Imperial.....	20c	10c	45c	15c
Con Virginia.....	20c	10c	45c	15c
Crown Point.....	20c	10c	45c	15c
Oon Washoe.....	20c	10c	45c	15c
Champion.....	20c	10c	45c	15c
Concordia.....	20c	10c	45c	15c
Deerfoot.....	20c	10c	45c	15c
Danby.....	20c	10c	45c	15c
Day.....	20c	10c	45c	15c
Eureka Con.....	20c	10c	45c	15c
Excelsior.....	20c	10c	45c	15c
Endowment.....	20c	10c	45c	15c
Gen Thomas.....	20c	10c	45c	15c
Grand Prize.....	20c	10c	45c	15c
Gila.....	20c	10c	45c	15c
Golden Chollar.....	20c	10c	45c	15c
Golden Terra.....	20c	10c	45c	15c
Goodshaw.....	20c	10c	45c	15c
Good & Curry.....	20c	10c	45c	15c
Hale & Norcross.....	20c	10c	45c	15c
Hillside.....	20c	10c	45c	15c
Highbridge.....	20c	10c	45c	15c
Homestake.....	20c	10c	45c	15c
Hussey.....	20c	10c	45c	15c
Independence.....	20c	10c	45c	15c
Julia.....	20c	10c	45c	15c
Justice.....	20c	10c	45c	15c
Joe Seaton.....	20c	10c	45c	15c
K Jackson.....	20c	10c	45c	15c
Kosuth.....	20c	10c	45c	15c
Keystone.....	20c	10c	45c	15c
Lady Bryan.....	20c	10c	45c	15c
Lady Wash.....	20c	10c	45c	15c
Leopard.....	20c	10c	45c	15c
Leviathan.....	20c	10c	45c	15c
Lee.....	20c	10c	45c	15c
May Belle.....	20c	10c	45c	15c
Modoc.....	20c	10c	45c	15c
Manhattan.....	20c	10c	45c	15c
Martin White.....	20c	10c	45c	15c
McClinton.....	20c	10c	45c	15c
Meadow Valley.....	20c	10c	45c	15c
Mexican.....	20c	10c	45c	15c
Mine.....	20c	10c	45c	15c
Morning Star.....	20c	10c	45c	15c
North Con Virginia.....	20c	10c	45c	15c
New York.....	20c	10c	45c	15c
Northern Belle.....	20c	10c	45c	15c
New Cosmos.....	20c	10c	45c	15c
Nevada.....	20c	10c	45c	15c
Oceidental.....	20c	10c	45c	15c
Ophir.....	20c	10c	45c	15c
Oriental.....	20c	10c	45c	15c
Orman.....	20c	10c	45c	15c
Panther.....	20c	10c	45c	15c
Phenix.....	20c	10c	45c	15c
Phil Sheridan.....	20c	10c	45c	15c
Potosi.....	20c	10c	45c	15c
Prospect.....	20c	10c	45c	15c
Raymond & Ely.....	20c	10c	45c	15c
R'cher.....	20c	10c	45c	15c
Rock Island.....	20c	10c	45c	15c
Rock Patch.....	20c	10c	45c	15c
Rough & Ready.....	20c	10c	45c	15c
Savage.....	20c	10c	45c	15c
Sag Belcher.....	20c	10c	45c	15c
Sierra Nevada.....	20c	10c	45c	15c
Silver Hill.....	20c	10c	45c	15c
Silver King.....	20c	10c	45c	15c
Silver Prize.....	20c	10c	45c	15c
Succor.....	20c	10c	45c	15c
Shepherd.....	20c	10c	45c	15c
Scorpion.....	20c	10c	45c	15c
Solid Silver.....	20c	10c	45c	15c
South Rodde.....	20c	10c	45c	15c
Standard.....	20c	10c	45c	15c
Star.....	20c	10c	45c	15c
St. Louis.....	20c	10c	45c	15c
Syndicate.....	20c	10c	45c	15c
Tioga Con.....	20c	10c	45c	15c
Tiptop.....	20c	10c	45c	15c
Trojan.....	20c	10c	45c	15c
Union Con.....	20c	10c	45c	15c
Utah.....	20c	10c	45c	15c
Vermont Con.....	20c	10c	45c	15c
Ward.....	20c	10c	45c	15c
Wells Fargo.....	20c	10c	45c	15c
Woodville.....	20c	10c	45c	15c
White Cloud.....	20c	10c	45c	15c
Yellow Jacket.....	20c	10c	45c	15c

## Sales at S. F. Stock Exchange.

Feb 1st day A.M. Dec. 30.	110	Union.....	11	111
25 Alta.....	1.65	215	Utah.....	215
0 Alpha.....	1.30	215	Wells Fargo.....	215
9 Andes.....	1.60	215	Yellow Jacket.....	215
Belcher.....	1.60	215	Arizona.....	215
Bullion.....	1.30	215	Albion.....	215
B & Belcher.....	1.30	215	Albion.....	215
Benton.....	1.30	215	Albion.....	215
Chollar.....	1.30	215	Albion.....	215
California.....	1.30	215	Albion.....	215
Con Virginia.....	1.30	215	Albion.....	215
Medonia.....	1.30	215	Albion.....	215
own Point.....	1.30	215	Albion.....	215
n Imperial.....	1.30	215	Albion.....	215
hequer.....	1.30	215	Albion.....	215
dd & Curry.....	1.30	215	Albion.....	215
g & Nor.....	1.30	215	Albion.....	215
co.....	1.30	215	Albion.....	215
Wash.....	1.30	215	Albion.....	215
an.....	1.30	215	Albion.....	215
ork.....	1.30	215	Albion.....	215
25 N. Belle Is.....	1.30	215	Albion.....	215
520 Northern Belle.....	1.30	215	Albion.....	215
700 Oro.....	1.30	215	Albion.....	215
550 Star.....	1.30	215	Albion.....	215
100 Syndicate.....	1.30	215	Albion.....	215
320 Silver King.....	1.30	215	Albion.....	215
200 Tioga Con.....	1.30	215	Albion.....	215
1.40 1/2 300	1.30	215	Albion.....	215

General at Shanghai has been informed that the Emperor of China has ordered the construction of a telegraph line from Tientsin to the Viceroy at Tientsin.

Bloomfield hydraulic mining employment to about 150,000 inches of water on their

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

## ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ.	ST.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Bullion M Co	Nevada	17	60	Dec 14	Jan 17	Feb 7	J M Brazell		328 Montgomery at
Bullion M Co	Nevada	27	10	Dec 13	Jan 24	Feb 21	J W Paw		310 Pine at
Belvidere M Co	Cal	9	50	Dec 7	Jan 10	Jan 29	C W Hubbard		310 Pine st
Bechtel M Co	Cal	7	15	Dec 3	Jan 10	Jan 31	W H Hunt		309 Montgomery at
Black Hawk C M Co	Cal	10	10	Nov 10	Dec 15	Jan 7	H A Charles		419 California at
Bullion M Co	Nevada	17	50	Dec 14	Jan 17	Feb 7	J M Brazell		328 Montgomery at
Buckeye W & H M Co	Cal	3	200	Nov 4	Dec 11	Jan 7	W H Lowden		320 Sansome at
Caledonia M Co	Nev	33	25	Nov 29	Jan 4	Jan 25	R Wegeuer		414 California at
Chollar M Co	Nev	5	50	Nov 9	Dec 14	Jan 4	W E Dean		309 Montgomery at
Colden Fleece M Co	California	19	30	Dec 19	Jan 23	Feb 12	F Sherman		755 Folsom at
Crown Point M Co	Nevada	44	50	Dec 23	Feb 2	Feb 23	J Newlands		327 Pine at
Excelsior Deep Cravel M Co	Nevada	14	25	Dec 23	Jan 29	Feb 14	D B Chisholm		327 Pine at
Harrington M Co	Nevada	3	05	Dec 28	Feb 3	Mar 2	O C Miller		324 Pine at
Hale & Norcross M Co	Nevada	67	75	Dec 8	Jan 13	Feb 7	J F Lightner		309 Montgomery at
Head Center M Co	Arizona	11	30	Dec 21	Jan 21	Feb 28	J W Paw		310 Pine at
Leeds M Co	Utah	3	15	Nov 16	Dec 27	Jan 25	D B Chisholm		327 Pine at
Julia M Co	California	14	30	Dec 15	Jan 20	Feb 1	H A Charles		410 California at
Julia Con M Co	Nevada	14	30	Dec 15	Jan 20	Feb 1	H L Charles		419 California at
Jakson M Co	Nevada	13	20	Nov 23	Dec 27	Jan 17	C M Shaw		403 California at
Mackey M Co	Nevada	5	26	Nov 23	Dec 30	Jan 24	J M Buntington		309 Montgomery at
Mammoth M Co	Cal	6	25	Nov 3	Dec 6	Jan 3	A W Rose, Jr		302 Montgomery at
Mono C M Co	California	10	50	Dec 28	Feb 2	Feb 23	W H Hunt		309 Montgomery at
Overman M Co	Nevada	48	50	Dec 2	Jan 6	Jan 27	G D Edwards		414 California at
Potosi M Co	Nevada	5	50	Dec 10	Jan 14	Feb 5	W E Dean		309 Montgomery at
Spaulding M Co	California	1	10	Dec 11	Feb 15	Feb 15	J H Parke		17 Battery at
Sierra Nevada M Co	Nevada	65	100	Nov 11	Dec 16	Jan 4	E L Parke		309 Montgomery at
Real Del Monte M Co	Nev	13	25	Nov 5	Dec 9	Jan 3	C Van Dyke Hubbard		310 Pine st
Original Gold Hill M Co	Nev	9	9	Nov 22	Jan 5	Jan 24	J M Buntington		309 California at
Tioga M Co	Cal	12	15	Nov 30	Jan 4	Jan 24	W H Hunt		309 Montgomery at
Union Con S M Co	Cal	15	100	Nov 13	Dec 16	Jan 3	J M Buntington		309 California at
Utah Extension M Co	Nevada	1	20	Nov 26	Dec 27	Jan 20	V Resavina		120 Sutter at

## OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Argenta M Co	Nevada	6	10	Nov 20	Dec 22	Jan 12	E M Hall	337 Pine at
Argenta M Co	Nevada	19	10	Nov 12	Dec 14	Jan 12	E M Hall	337 Pine at
Columbia Smelting M Co	California	1	10	Dec 15	Feb 2	Mar 2	D Maracovich	403 California at
Dudley M Co	Cal	11	10	Dec 7	Jan 10	Feb 7	E C Masten	309 Montgomery at
Eagle S M Co	Cal	15	10	Nov 15	Dec 15	Jan 15	J E Byrne	533 Kearny at
El Tesoro M Co	Lower Cal	9	25	Dec 6	Jan 18	Feb 8	W H Chickering	214 Sansome at
Flowers M Co	Nevada	4	10	Dec 16	Jan 20	Feb 10	W W Stetson	309 Montgomery at
Hillside M Co	Nevada	4	100	Dec 17	Jan 21	Feb 14	F Frankenthal	cor Battery & Cal at
Jupiter M Co	California	11	25	Dec 19	Jan 12	Jan 31	E C Masten	309 Montgomery at
Marion White M Co	Nevada	8	25	Dec 17	Jan 26	Feb 23	J J Scoville	309 Montgomery at
Maryland Con & S M Co	Cal	2	25	Dec 10	Dec 30	Jan 14	E P Farnsworth	202 Sansome at
Mayfield Con M Co	Cal	6	10	Dec 8	Jan 14	Feb 5	J W Taylor	310 Pine at
Merchant M Co	Cal	5	15	Dec 4	Jan 3	Feb 2	S D Rodgers	Safe Deposit Bldg
Mount Auburn M Co	California	3	50	Nov 24	Dec 24	Jan 24	J R Newell	330 Pine at
Murchie M Co	Nevada	6	15	Dec 4	Jan 3	Feb 2	S D Rodgers	Safe Deposit Bldg
Nevado M Co	Nevada	7	20	Dec 11	Jan 17	Feb 5	E M Hall	327 Pine at
Oro M Co	Cal	6	10	Nov 15	Dec 15	Jan 15	Wm Stuart	310 Pine at
Orion M Co	California	6	20	Nov 26	Dec 27	Jan 13	P Conklin	535 Market at
Pittsburg M Co	California	8	10	Dec 1	Jan 6	Jan 27	R Waggoner	414 California at
Pioneer Sil ver Belle M Co	Arizona	1	04	Dec 3	Jan 3	Jan 24	N T Weser	233 Montgomery at
Red Cloud Con M Co	Cal	9	15	Dec 9	Jan 13	Feb 7	J W Taylor	310 Pine at
Rose M Co	Arizona	2	03	Dec 22	Jan 22	Feb 21	S D Rodgers	328 Montgomery at
South Bulwer M Co	California	8	25	Dec 9	Jan 10	Feb 2	W Stewart	320 Sansome at
Silver Hill M Co	Nevada	13	30	Nov 16	Dec 21	Jan 11	W E Dean	309 Montgomery at
Widawake Prospecting M Co	Arizona	11	31	Oct 18	Dec 16	Jan 10	H Hildebrandt	227 Sutter at
Wyoming & Dakota W Co	Dakota	3	20	Oct 18	Dec 7	Jan 3	Theo Widmann	404 Montgomery at

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Aurora Tunnel M Co	Nevada	C V Hubbard	310 Pine st	Annual	Jan 17
Consolidated Virginia M Co	Nevada	A W Havens	309 Montgomery st	Annual	Jan 13
Cold Hill Con M Co	Nevada	H Hudson	320 Sansome st	Annual	Jan 3
Henrietta C M Co	California	F Klostermann	707 Sansome st	Annual	Jan 14
Idaho M Co	Nevada	C Mead	324 Pine st	Annual	Jan 10
Iowa M Co	Nevada	W M Gillespie	411 California st	Annual	Jan 11
Kosuth M Co	California	B F Stone	306 Pine st	Annual	Jan 17
Mountain C S M Co	California	B E Henriksen	213 Mission st	Annual	Jan 10
Northern Light M Co	Nevada	P S Monroe	310 Pine st	Annual	Jan 3
Pocahontas G M Co	California	A Staples	113 Leidesdorff st	Special	Jan 3
Silver King M Co	Arizona	J Nash	328 Montgomery st	Annual	Jan 11



**THE NORTH BLOOMFIELD.**—Nevada City *Herald*, Dec. 24: Work at the North Bloomfield hydraulic diggings progresses with the usual amount of activity. The company is employing a full force of men, with which agents, number nearly 200, are about 3,000 inches of water are being run through their ditches.

**HYDRAULIC RIG.**—George E. Turner has just completed a very fine hydraulic rig for Yu Wen & Co., at Moore's Flat. The bulkheads are 65 inches in diameter. There is attached 1,700 ft. of 22-inch pipe, 600 ft. of 26-inch and 300 ft. of 30-inch. It occupied 20 days to manufacture the whole lot, and when put up will be one of the finest hydraulic rigs in the country.

**THE MOUNT AUBURN.**—The developments in the Mount Auburn quartz mine, owned by C. K. Kerby, and situated 2 miles northwest of town, are daily becoming more encouraging. The ledge proves to be very rich, both on the hanging and foot walls, and contains rich sulphurates and plenty of free gold. The prospects of this claim are of such a bright character that the probabilities are that ere long the Mount Auburn will be opened up many years ago, but was considered worthless by those who spent a little money in trying to develop it. In fact, during the last 5 years so little work was done in it that it was considered jumpable. It was attempted, and resulted in a lawsuit between Solomon Johnson, deceased, who was then the owner, against Tilley Holland & others, but the case was decided in favor of the former. A few years ago, C. K. Kerby, the present owner, purchased over a year ago, the claim and furnished capital to commence operations and develop it. His operations are proving to be successful, and there is not the least doubt but what he has a valuable piece of mineral property. There are many other claims in this vicinity that are now lying idle for the want of small capital to work them, and which would, with systematic and economical working, prove to be valuable mineral resources to the country.

**PROSPECTS.**—Dutch Flat *Forum*, Dec. 25: Last week O. B. Chadwick and William Thraen brought to our office about \$30 worth of gold they had just cleaned up from the contents of 4 carloads of gravel from the new incline in the East New York mine. The sample lot consisted of nuggets and dust of the coarsest quality. The largest nugget weighed a little more than 35, and the gold was of a fine quality. The East New York is located in the deep hollow section, in Nevada county, about 6 miles from Dutch Flat, and is owned by L. P. St. Clair, who owns a 1/2 interest, and G. B. Chadwick, William Thraen and Charles Harvey own the other 1/2 interest, all of whom are residents of this place. The proprietors have been engaged in running a hedrock tunnel for the past few years, which is now in a distance of 2,000 ft. At the end of the tunnel an incline was started, in which the sample lot of gold was found. They say the gravel looks fine and every indication of a big run is excellent.

**PLAGER.**—Cisco *Con.*—Dutch Flat *Forum*, Dec. 25: The Cisco Con. company has just got the necessary machinery for a 10-stamp quartz mill on the site of its mine, about 3 miles from Cisco, across the Yuba river, on Red mountain. The mill will be erected as soon as possible, when work of crushing quartz will be commenced. Some years ago a large number of claims were located on Red mountain, but nothing has been done in that section until the Cisco Con. company commenced active operations about 2 years ago. This company has an extensive ledge of gold-bearing quartz, and has developed it by running a tunnel some 2 1/2 miles into the hill and sinking a shaft 50 ft. deep at the end of the tunnel. They also have run 2 crosscuts 40 ft. long. So far as developments have been made, at no place have they worked through the ledge. The Red mountain section will undoubtedly prove one of the best paying quartz mining sections in this part of the State, at no distant day, when it becomes more fully developed.

**PLUMAS.**—Cherokee—*Greenview Bulletin*, Dec. 22: This company is having several large sleds built for the purpose of hauling ore from the mine to the mill, a distance of about 14 miles. They are double runners, are very strong and are being heavily trawled by William Stevens, at his blacksmith shop.

**ROUNDT VALLEY WATER CO.**—The new pipe in the line of the Green Mountain ditch across the McClellan ravine has been put in place, and the water turned in. It works perfectly satisfactorily, and will obviate the difficulty of maintaining a ditch across the ravine, as the frequent slides during the winter and spring months have rendered it almost impossible to keep the ditch in order.

**GREEN MOUNTAIN.**—Several new buildings have been constructed recently for business convenience. A changing house for the use of the men has been erected at the mouth of tunnel No. 4, 12x16 ft. An office 16x22 ft., a woodshed 16x21 ft. and a cellar-house 10x16 ft. have also been put up. A barn 30x36 ft. is in course of construction, and will soon be completed. Both mills are running steadily, and all business pertaining to the mine is moving forward regularly.

**SIERRA.**—Rich Nunners. *Mountain Messenger*, Dec. 25: Darling & Cox recently found in the sluice at their gravel claim, on Howard creek, 4 miles north of Bassett's, 2 pretty good specimens. The largest is valued at about \$50, and the other \$20. Indications are good for more, as 1 piece last summer was taken out of these diggings worth \$207. This is a telling argument against those who prate there's nothing left in the Sierra mines.

**CONTRACT LET.**—The Wilbourn Con. mining company has let a contract to run 300 ft. of hedrock tunnel on its claim, at \$1.90 per ft., the contractor furnishing everything. Wm. Wilbourn has the job.

**GREEN PATE.**—The 7 tons of Forest Green rock, worked at the Gold Bluff mill, resulted in a return of \$36 per ton. The yield is highly satisfactory. The company is pushing its tunnel into the mountain. A lower tunnel will be started in the spring.

**TRINITY.**—At Work. *Trinity Journal*, Dec. 25: Miners are now all at work with a good supply of water, and indications for a continuance are quite favorable. Sufficient rain has fallen up to this time to soak the ground pretty thoroughly, and with the rains we get in the future will be of direct benefit to the miners.

**STRUCK THE LOSE.**—We learn that the men working for Mr. Grayson on the Brown Bear mine, Deadwood district, have struck the lode some distance below the surface, after running about 130 ft. of tunnel. Report also says that it prospects fully as well at the bottom as on the surface, which is considered sufficient inducement for putting up a mill and building a wagon road to French Gulch in the spring.

**NEVADA.**—WASHOE DISTRICT. The following statements, made by Superintendents, are for week ending Dec. 27th:

**SIERRA NEVADA.**—During the week 181 tons and 1,000 lbs. of ore have been extracted. There were 04 cars of ore sent to the California mill, the average assay of which was \$27.44. The average assay of ore raised during the week was \$22.10.

**UNION CON.**—During the past week 255 1/2 tons of ore have been extracted from the 2500 level, and 333 tons and 1,200 lbs. were sent to the mills; assay value, \$23.54. On the 2500 level drift hole No. 4 has been extended 140 ft.; assay from a trace to \$31.

**CALIFORNIA.**—During the past week 414 tons of ore have been extracted and sent to the mill; assay value, \$20.03. On the 2300 level are cutting a drain in the north drift and enlarging the connection.

**HALE & NORTON.**—Extended west crosscut, 2400 level, 38 ft.; face in quartz and porphyry. Have replaced the 11-inch air-pipe with 16-inch pipe, to facilitate the work. Will resume drilling by the 24th inst. Hoisted from 2100 level 30 tons of ore, assaying \$145 per ton.

**OVERMAN.**—Station north winze has been completed, and have started an east drift from same which is now in 34

ft. from winze. Forman shaft has been sunk and timbered 30 ft.; total depth, 1,555 ft.

**C. N. S. SHARP.**—Another carload of material for the hydraulic pumps has arrived, and the work of putting in the pump has been resumed. Shipments of the engine have been commenced, but none of it has yet arrived.

**OPHIR.**—On the 2500 level the joint Mexican east winze has been sunk and timbered 13 ft., the joint Mexican west crosscut 14 ft., the California upraise 12 ft. and the joint California east crosscut 37 ft.

**CALIFORNIA.**—Pumps have run an average of 13 1/2 hours per day, consuming 5 1/2 cords of wood per day. Forman shaft has been sunk and timbered 30 ft.; total depth, 1,555 ft.

**CON. VIOLINA.**—During the week 1,080 tons of ore have been extracted and sent to the mills; assay value, \$23.12. On the 2300 level the south drift has been advanced 29 ft.

**CON. IMPERIAL.**—During the week have been repairing station 2135 ft., which were were compelled to destroy during the late fire to prevent the spreading of the flames.

**UNION SHARP.**—The shaft has been sunk and timbered 7 ft.; are cutting out tank-pit at the 1000 level, a bob-pit at the 2200 level, and easing timbers at the 2400 station.

**SAVAGE.**—The shaft force has, during the week, been engaged in usual repairs, and the drift force has been engaged in extending the drift on the 10th level.

**CHOLAN.**—The south drift on the 2400 level was advanced during the past week 31 ft. through porphyry, clay and quartz. The formation is still dry.

**UTAH.**—During the past week the east drift on the 1950 level has been advanced 14 ft. On the 2150 level the east drift has been extended 21 ft.

**C. & C. SHARP.**—During the week the shaft has been sunk 5 ft.; total depth below the 2300 level, 184 ft.

**G. & C. AND B. & B. SHARP.**—Have sunk and timbered the shaft during the week 15 ft.; total, 1,950 ft.

**EUREKA DISTRICT.**—Eureka *Sentinel*, Dec. 22: There is much depending upon the work being done in the Titus mine. All about this property are locations in which many of our citizens are interested. They look for Mr. Atchinson, the Williamsburg folks or the Titus company to make things lively in their camp ere long. Everybody knows that the Williamsburg has a large quantity of low-grade ore, and the Mr. Atchinson is prospecting, with good indications and some ore. We were told that the Titus folks yesterday afternoon cut a stringer of fair assaying ore, and they are not near the ground where they expected to tap the ore vein. The striking of a good ore body in the Titus would help that immediate section of our district, because it would induce the expenditure of large sums which are now in the pockets of Eastern capitalists, but who only need showing the return of their capital, with interest, to make them put up.

**SHIPPIN.**—Charley Bro's teams delivered 11 tons of ore from the Grant mine, just southwest of Ruby Hill, to the Eureka Con. furnaces, yesterday, for treatment. The Grant has been worked on lease of late, and in the years gone by has yielded more than any other property on McCoy hill. One feature of its notoriety is the remarkable richness of its deposits, some assays running away up into the hundreds. The Needles mine is adjoining the Grant, and has yielded some very rich ores.

**MINING NOTES.**—The late storm has greatly retarded assessment work. Very encouraging developments have recently been made in the Sterling mine. Sullivan & Co. are doing work on the claims between the Lord Byron and Deane mines. A body of good ore has been struck in the Banner mine, which will probably improve as development is made. McDowell, Superintendent of the Titus, and other mines is doing assessment work on all the mines under his charge. The recent stormy weather on Prospect mountain has deterred many miners from completing their assessment work. Rose & Burgess have just had some ore sampled from the Woodchopper mine, at Spring Valley, which went some \$500 to \$600 per ton at the Eureka works. Seven tons of ore were brought in from the Rescue mine, in White Pine county, yesterday, and sampled at the Eureka Con. works, which will assay in the hundreds.

**CHERRY CREEK DISTRICT.**—No Need to Rush. *Ward Reflex*, Dec. 26: John Doscher, who came over from Cherry Creek Sunday last, says the people over there are at a loss to know what is causing the rush to that place. No more work, he says, is being done there at present than at any other time during the year. The mine—the Star and Exchange—are being worked, and the 6-stamp and Star mills are running on ore from the Exchange and Star mines. The only other work going on in the district pertaining to mining is the grading of the Teacup mill site. The people are looking forward next spring and have great expectations.

**GRANTSVILLE DISTRICT.**—BROOKLYN. *Grantsville Bonanza*, Dec. 25: In the west drift of the lower level of the Brooklyn mine some very rich ore is being passed through of unknown extent. The ore extracted in running this drift is being worked with the balance of the Brooklyn ores in the Alexander mill, and is materially increasing the value of the pulp. The Brooklyn, being the largest mine in the district, has been doing well in the market, as the ore continues to improve in extent and richness as the mine is opened.

**THE CENTINIAL.**—Work progresses satisfactorily in this location of the McMahon and Irvine M. Co. The horse reported in the last issue of the *Bonanza* has been passed through, and the ledge is as solid and compact as ever again, the ore being very fine and showing chloride and black matrix. The ledge continues to widen as the drift is extended, and the prospects are very flattering for opening up an extensive body of fine milling ore.

**THE ALEXANDER.**—Work continues as usual in the Alexander mine, which is producing an increased quantity of ore of a higher grade. The ore stopes are looking better and better every day. The Alexander is undoubtedly one of the highest mines ever opened in eastern Nevada, and there are immense bodies of pay ore in eight that promise a long and profitable run for the Alexander company's mill.

**MOHAWK VALLEY DISTRICT.**—MINING IN THE VALLEY. *Reno Gazette*, Dec. 27: Isaac Weston, Joshua Laws and other Reno men have come into the property in the Mohawk Valley which they have been developing. They set up there last fall the little 2-stamp mill which had been running here during the summer. By the time they got it in operation, snow obliged them to shut down. This winter they are working in the mine and taking out ore for milling in the spring.

**PARADISE DISTRICT.**—THE CURTIS MINE. *Grantsville Bonanza*, Dec. 25: From E. E. Tarrant, who has just returned from Paradise district, we learn that about 40 tons of ore have been shipped from the Curtis mine to Virginia City for the purpose of having it assayed. This mine is one of the many locations owned by Messrs. Curtis, Welch, McLaughlin and Baldwin.

**TAYLOR DISTRICT.**—POOR RETURNS. *Ward Reflex*, Dec. 26: Some parties, a short time ago, shipped 2 1/2 tons of ore from Taylor district to Salt Lake for reduction, that was, when it started; sufficiently rich to justify shipping to a more distant point. Visions of untold wealth haunting the Mormon teamster, he divided with them, and "salted" the remainder with common rock. The returns are anything but satisfactory, and it would be up-hill business to attempt to convince the owners of that ore that Latter Day Saints won't steal.

**WARD DISTRICT.**—THE OLD FORMATION STRIKE. *Ward Reflex*, Dec. 26: The same formation has been struck in the crosscut north in the main tunnel, 2,400 ft. from the mouth, which is now in 30 ft., in which the ore bodies were found in the upper workings of the Paymaster. Another crosscut south, 2,100 ft. from the mouth of the tunnel, has run into the same formation, and the continuation of the Paymaster crosscut will be started from the face north to explore the

old carbonate chamber, the extent of which was never found in the upper workings.

**CROSSCUTS NORTH.**—The work of driving the Martin White main tunnel ahead has been stopped and a crosscut started north instead. The crosscut to the south is now in over 300 ft.

**WHITE PINE DISTRICT.**—ESRIHARDT & AURORA. *Eureka Sentinel*, Dec. 23: It is currently reported here that the Esrihardt & Aurora tunnel will close down all operations after to-morrow. The company's mill will probably be kept running on tailings for about 30 days. We regret to learn that work is to be stopped in the tunnel, at least until some crosscutting has been done to prospect for an ore body. However, we hope the stoppage of work will only be temporary. An extensive ore body will be found in the mine at some future day.

**ARIZONA.**—TOMBSTONE. *Arizona Citizen*, Dec. 25: There have been no important strikes in any of them during the past week, except the Sunset; but they have all been steadily increasing in body and richness, but not to enough extent to make an important strike. The Sunset, in shaft No. 2, at the depth of 100 ft., struck a large body of ore which assays well. The Graham is looking better than it ever has, and they are now sinking on as good a body of ore as has ever been struck in camp. They are now down about 100 ft. Mr. Billick is still sinking on his Allen street shaft of the Mountain Maid, and there is every indication of striking a large body of ore before they go many ft. deeper. On the Tough Nut they are placing the machinery in the new hoisting works house, and are now down about 145 ft.

**ARIZONA.**—Arizaca things begin to look as if business of importance would be transacted before long, several fine-looking properties having been bonded to Eastern capitalists, and one or two sales made, the consideration being snug little sums. Developments have been going on quietly, and several claims, considered poor properties 2 or 3 months ago, are turning out to be very valuable claims, and held at good figures by the lucky owners. At the Con. Arizona mill and mine work is being pushed vigorously. The mill is expected to be started up by January next. For 14 days past the "Longarina" mine has kept the Derre mill busy crushing its ore. From the Plo-moss mine, near Silver Hill, some very fine ore is extracted. In Oro Blanco Supt. Kirkpatrick, of the Orion Co., is pushing his mill towards completion, and before long he also will send his stream of bullion from ore extracted from the Warsaw and other claims belonging to the company. In the same district the Arizona Prospecting Co., under the direction of Supt. A. N. Noon, are doing some work on several of their valuable claims. In the Sierritas, Mr. Jack Mahall is hauling out some splendid ore, which assays very well.

**SANTA RITAS.**—The Goldtree mine has a 50-ft shaft and about 120 tons of ore on the dump, which shows mostly soft metal, chloride and galena. The Gambrinus and Georgia mines, developed with an 80-ft shaft, show a true vein of from 20 to 30 ft. in width. The Christmas Present, by open cuts, shows a 30-ft ledge of galena, horn silver, carbonates and chlorides. The Aztec No. 3 mine has a shaft 75 ft. in depth, showing a ledge of from 5 to 7 ft. wide. The Lost mine has a 100-ft shaft, with a 2-ft ledge. The Red Cloud has 3 shafts respectively, 63 ft., 45 ft. and 15 ft.; these shafts show a ledge from 18 inches to 5 ft. of chloride, patanka (black metal) and native silver. The Break of Day mine has a 16-ft shaft, showing a 3-ft vein. The Thunder mine has a 20-ft shaft with open cut, showing an 8 ft vein of chloride and galena. The Birthday and Evening Star mines have large croppings which show a 30-ft ledge. The Nonpareil, on the upper slope of the Goldtree mountains, an extension of the Goldtree mine, shows a very rich ledge of chloride ore. The Miners' shows in the 2 shafts now sunk a good body and well-defined ledge of rich chloride and patanka. The Grampus, on the upper slope of the Gambrinus mountains, has a very fine body of smelting ore.

The Devil's Cache mine has a 60-ft shaft and an open cut, showing a ledge 30 inches wide, carrying 23% lead, 30% copper and \$726 per ton in silver. Good practical miners and business men are needed in the camp, for some men have done more harm by their reports, bad management and work, than can be repaired in a year of good, honest labor, which has disappointed investors. The mines are there, but it requires more than one week to see them, all and to do justice to them.

**COLORADO.**—EMPIRE. *Colorado Miner*, Dec. 25: At this point there is considerable activity. They are starting up the South Legion and shipping from 2 to 3 wagon loads of ore per day to the Stephens mill for concentration. The ore runs 5 ounces in gold per ton, and \$30 silver. Mr. Woodruff, who has recently arrived from St. Louis, is fitting up the Candee mill by putting in concentrating machinery, which will greatly benefit the camp. Edward Freeman has started up work on 2 of his lodes—Great Eastern and Rising Sun. The surface quartz on the former carries gold \$100 per ton, and the latter is carrying 10 stamps daily, and with good results. Capt. Thomas Baird will soon start up work on the Silver Mountain. All parties owning property here are having more faith than ever, and the consequence is a large amount of work is being done, and Empire is pushing to the front again.

**KELLY MOUNTAIN.**—The Lincoln lode, owned by Major E. S. Platt, and opened by an adit near the wagon road at Spanish bar, is again being worked. The ore is a gray and iron pyrites. A crosscut on the vein recently encountered a vein of ore 1 ft. in width. Six men are at work on the Donaldson lode. Six tons of ore were shipped about a week ago, giving for first-class \$223 per ton, and something over \$100 for second-class. The first-class carried 10 ounces of gold per ton, the remainder of the value being in the silver. Work was resumed this week on the Champion lode, which is owned by New York parties, and superintended by Thomas Cooper, of Idaho Springs. The Cusaco Con. is owned by the Citizens Republic lode, owned by Messrs. Morris, Wayne and P. R. Stanhope, carries native silver in the shaft, which is now 50 ft. deep. The Little Metta is on the same vein as the latter. Gov. Bryan purchased a controlling interest in the property, and has also purchased 3 other claims on Chicago creek. The Little Etta tunnel company owns about a dozen lodes, some of which will be vigorously worked at the commencement of the new year.

**HURKLE MOUNTAIN.**—The Fairmount-Schaffer is now superintended by John McCuen. There is a large body of ore in sight in several places, and a force of men, principally contractors, are opening up the mine in good shape. The ore is principally iron and copper pyrites with black oxide of copper, carrying gold, silver and copper. The Dominion lode is the property of the Dominion mining and smelting company, L. A. Gilman, Superintendent. A dividend capital is provided for the development of the property, which has been shipping ore for many months past. The Maud Munroe lies but a short distance from the Dominion. It is owned by Messrs. Elliott, Munroe, Miller and Barber, who are sinking a shaft on about 1 ft. of ore that runs over \$100 per ton.

**SEATON HILL.**—The Tropic is the most prominent mine on Seaton mountain. The main shaft is now about 225 ft. deep, and there are about 100 tons of ore now awaiting shipment, about 60 tons of which is first-class and the remainder concentrating. It is estimated that the mine is clearing about \$6,000 per month with a force of 37 men. The Gem mine, lying a short distance above the Tropic, is owned by E. K. Stinson & Co., and has a shaft 200 ft. deep. Ten men are now at work. The vein is leached by Messrs. Gilson, Rane, who have recently run a crosscut to the lode and found a vein of ore 1 ft. thick, carrying gray copper and running as high as \$500 to \$600 in gold and silver. The Metropolitan, owned by Hagland & Co., is one of the steady producers on Seaton mountain. It possesses considerable development and is continuously worked by its owners. The ore often consists largely of galena, but runs well in both gray and silver. The first-class mine runs 20 to 250 lb. in gold per ton, and carries a large percentage of copper. This property is on the line of the Idaho tunnel.

## IDAHO.

**IMPORTANT SALE.**—Yankee *For Herald*, Dec. 20: The sale of the Ana mine, on Ouster mountain, has been consummated. It was the property of Mr. Jerome Colvin and James Viar, who got \$20,000 for it. The Ana is one of the best mines in the Yankee Fork district, and the price at which it was sold is low. The company that bought it is composed of Salt Lake men.

**BOISE COUNTY.**—I have, in former letters, neglected to speak of one of the most important mining enterprises, or set of enterprises, on this side of the basin—the gravel drifting claims of Gold Hill, near this city. Six companies are at work—3 white and 3 Chinese. The gravel lies between the bedrock and a hard formation of clay, the average depth of the pay dirt being 6 ft. These claims usually give employment to about 100 men—though hardly that number are at work at present—and are operated the year-round. The combined yield of these claims is estimated at between \$150,000 and \$200,000 annually. Work is going on in the Rising Sun mine and one or two others on Shaw's mountain. A general resumption of operations at that camp will doubtless take place in the spring. The Elmina Co.'s tunnel on the Crown Point, at Bannock, is now in over 100 ft., and if the contractors keep up their rate of speed they will have it completed earlier than was anticipated by us outsiders.

**YANKEE FORK.**—Mr. T. R. Butler, Supt. of the Custer mine, Yankee Fork, has been interviewed by a reporter of the Salt Lake *Tribune* concerning the Yankee Fork mine and Custer mill. Speaking of the mines of that region, he said half enough has not been written about them. In fact there are no mine owners up there who have axes to grind; they have good properties and are well satisfied. The developments during the past year have shown up strong veins and rich ores. The mines on East's mountain and along Jordan creek are looking well, while the outlook on the Custer mountain exceeds the expectations of the most sanguine. The 20-stamp mill on the Custer property had been started before Mr. Butler left, and it is said to be one of the nearest mills of the kind on the coast. The shaft of the mill is 117x100; ore here, 47x30 ft., capable of holding 1,000 tons. The engine is a Harris-Corlies, 13x45, indicating horse power, 175. There are 3 boilers, 10 ft. long by 54 inches, steel shelves, etc.; an 18-ft revolving drier. The chloridizer used is like the Bruckner without the diaphragm, its length is 18 ft. over all, and diameter is 6 ft. The water system around the works is very complete. A pressure has been secured of 70 lbs to the square inch. The ore is sent down from the mine by means of a suspended wire tramway (Haldane's patent). The rope is 6,500 ft. long, the direct length of the tramway being 3,200 ft. The capacity of the tramway is 30 tons in 24 hours. Next summer there will be at least one more mill on the Yankee Fork.

## MONTANA.

**THE MOUTON.**—Butte *Miner*, Dec. 23: Very satisfactory progress is being made at the Mouton works. The 3 shifts of men employed in sinking the shaft are making excellent progress, and a depth of 25 ft has been attained, the eighth set of timbers being put in yesterday. The frame work for the hoisting works is being prepared as expeditiously as possible, and their erection will begin at the earliest practicable moment.

**THE MOUTON.**—The old shaft is being sunk night and day, and has attained a depth of 170 ft. The new shaft also is being vigorously prosecuted, the men now working 100 ft from surface. The two were connected several weeks ago by the 70-ft level. The 70-ft drift, running west from the new shaft, is yielding a considerable amount of ore of excellent grade. The ore lies on the foot wall, the vein dipping south, and is nearly 2 ft wide.

**THE MOUTON.**—Drifts east and west on the vein have been started from the north crosscut and have been extended about 12 ft in each direction. On the south of the main vein a drift has been started east, the face of which is now in 12 ft from the crosscut. These drifts have been started with a view to prospect the ledge more than for the immediate extraction of ore. The pump is kept in almost continuous operation, and it is not unlikely that a new pump of increased capacity will have to be placed in position.

**STEVENS.**—The foot and hanging wall strata of ore in the new shaft are enlarging with the attainment of depth, the former now being 2 ft and the latter 20 inches in width. The quality of the ore is also improving and is not mixed with worthless matter. The "horse" noticed in previous reports gives evidence of taking its leave.

**SNOOZER.**—This, as yet, is a mere prospect, located near Centerville, most of which has been taken in by the patent. It is owned by McNamara, Devlin, et al., and is developed by a shaft 30 ft deep, sunk just south of discovery. The vein in the bottom is several ft. in width, and though not of high grade the owners are confident of an improvement with depth.

## NEW MEXICO.

**MAQUALENA MINE.**—*Cor. News and Press*, Dec. 16: I have been here 10 days looking over the mines, and I find some very large bodies of carbonate of lead ores that average from 5 to 25 ounces of silver to the ton, and from 10% to 60% of lead. The veins are from 10 to 60 ft wide, and lie between lime and porphyry. There has been very little work done on any of them, and the small amount of ore mined was smelted in an old-fashioned furnace that was put up here a long time ago. Properties are not held at high figures, and there are many chances for profitable investments. The mines are 30 miles from Socorro, and the weather is warm and pleasant all the year round, there being no snow.

**PLUMAS.**—Among the many resources of Colfax county, perhaps none has attracted so little attention as the immense beds of graphite, or plumbago, that are found in the foothills along the Canadian river and some of its tributaries. Plumbago has been found cropping at the surface in 4 or 5 localities quite distant from each other, in beds from 3 to 5 ft in thickness. The specimens taken from the different outcrops show in mass a fine, smooth texture, free from grit and apparently of excellent quality, though of this we cannot speak with certainty, as is chemical analysis of it has not yet been made. Many fine crystals are found, both hexagonal prisms and plates. The value of large beds of graphite of good quality so near the railroad must be very great, and it might well pay capitalists to examine this district.

## OREGON.

**FROM SILVER CREEK.**—*Sentinel*, Dec. 22: Mr. Thomas F. Rogers, of Silver creek, in Josephine county, called on us last week and showed us some very handsome gold recently taken out of his mining claim on that creek. The specimens are heavy smooth gold, such as is called "lead" gold by miners, as it is thought to indicate a lead or continued pay streak, and weighing from \$1 to \$4. A nugget was taken out of a few weeks since weighing \$31, and Rogers says half-ounce pieces are quite common. He estimates the average wages of the miners at \$5 per day, and says that only about 3 will remain in the camp during the winter, the snow being already 2 1/2 ft deep.

## UTAH.

**SILVER REEF DISTRICT.**—*Miner*, Dec. 22: The Richmond steam engine, which was ordered by the Barbee & Walker last week, has been set up in the west end of the hoisting works, and Monday morning steam was turned on for the first time. The machinery worked splendidly, and the specimen of Wad turned out was pronounced by Foreman Gamble to be A No. 1 quality. Pipe is now being laid down the main incline, and the first operations of the new drill will be at the bottom station.

**STRACK & SRA.**—Salt Lake *Tribune*, Dec. 20: The Harrisburg Hill company, whose properties all lie close together in Star district, has been, for some time back, looked upon as very promising. The company renewed work upon the Kamaarrah and made a strike of a 4-ft vein of rich ore. A letter just received from the mine reports as follows: "I am still at work on the Kamaarrah. It is looking splendid, and the ore is of high grade. I have taken out 50 tons of ore, and lots of it in sight in the mine. I am taking out about 5 tons a day on an average. I have made 3 assays, each of different qualities of the ore. One sample went 606 ounces silver per ton, and lots of the same kind in the mine and on the dump."



### The Abomination at our Doors.

It is currently reported that there are now being large quantities of oleomargarine brought into this city from the Eastern manufacturers, and the counterfeit is now being sold as butter to unsuspecting people. The late scarcity and consequent high price of butter has afforded the avaricious dealers just the opportunity they desire to reap large gains from the sale of this cheap and dangerous material at a high price. Such success has been attained by the makers in giving this compound of tallow, sour milk and coloring matter such a semblance to butter that those who are unused to the finest product of the churn are deceived, and consequently imposed upon. It is easy to see that thus filling the demand for a common grade of butter with oleomargarine, the market for the legitimate product will be seriously interfered with, and the rewards of honest producers much reduced. Thus our dairy interest is assailed, and unless something is done to warn the consumer of the fraud practiced upon him, much money, which should go to building up our true dairy enterprises, will be turned aside into the pockets of the tallow churners.

It is a shame that this foul stuff should be brought into so fine a dairy State as California. It is an outrage that innocent eaters should be subjected to the menace to their health which this pernicious material is shown to embody. But it will do very little good to merely declaim against the evil; the greed of dealers is proof against exhortations. It is a sad reflection that it is quite probable that commission houses which have reached wealth by the money made out of the true products which have been consigned to them, should now turn against the producers who have made them rich, and sell in competition with their patrons' product this Eastern abomination. We do not know what is the case in this city, for we have not yet ascertained who is handling the false butter; but experience in New York has shown that such dealers were not slow to play the traitor to the true interest by dabbling in the false, which yielded them great profits.

It is plain that something must be done about this new evil or our butter makers will experience a much greater depression of values than they have had hitherto, and that they could not stand without failure. There seems but one thing to do, and that we learn from Eastern experiences. It is not practicable to prohibit the manufacture and sale of the material, but it is practicable to order that it be sold under its own name and not as butter. This much the law will do a great deal to repress the evil, for, if every package is indelibly branded and if every retail dealer is forced to put a label upon every piece he sells, no matter how small, then no one will buy oleomargarine without knowing what he is purchasing. With this much assured it devolves upon the public press to inform their readers just what oleomargarine is, and this exposure of its nature and composition will go far to repress its sale.

We are not sure whether the general law against adulteration of foods, etc., in this State, would adequately meet the case of oleomargarine or not. Probably it would not, for other States have had general anti-adulteration acts, and yet have adopted special acts to meet this special form of evil. No time should be lost in protecting our butter interest in this regard. The Legislature will soon meet, and the relief should be had at once. In order that all our readers may see the nature of the act adopted in New York State, we append a full copy of it as follows:

An Act for the protection of dairymen, and to prevent deception in sales of butter.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Every person who shall manufacture for sale, or who shall offer or expose for sale, any article or substance in semblance of butter not the legitimate product of the dairy, and not made exclusively of milk or cream, but into which the oil or fat of animals not produced from milk, enters as a component part, or into which melted butter, or any oil thereof, has been introduced to take the place of cream, shall distinctly and durably stamp, brand, or mark upon every tub, firkin, box or package of such article or substance the word "Oleo-Margarine," and in case of retail sale of such article or substance in casks, the seller shall, in all cases, deliver therewith to the purchaser, a written or printed label bearing the plainly written or printed word "Margarine." And every sale of such article or substance not so stamped, branded, marked, or labeled, is declared to be unlawful, and no action shall be maintained in any of the courts of this State to recover upon any contract for the sale of any such article or substance not so stamped, branded, marked, or labeled.

Sec. 2. Every person who shall knowingly sell, or offer to sell, or have in his or her possession with intent to sell, contrary to the provisions of this Act, any of the said article or substance required by the first section of this Act to be stamped, marked, or labeled as therein stated, not so stamped, marked, or labeled, or in case of retail sale without delivery of a label required by Sec. 1 of this Act, shall, for each such offense forfeit and pay a fine of one hundred dollars, to be recovered with costs in any of the courts of this State, having cognizance thereof, in an action to be prosecuted by the district attorney, in the name of the people, and the one-half of such recovery shall be paid to the informer, and the residue shall be applied to the support of the poor in the county where such recovery is had.

Sec. 3. Every person who shall knowingly sell, or offer or expose for sale, or who shall cause or procure to be sold or offered or exposed for sale, any article or substance required by Sec. 1 of this Act to be marked, branded, stamped, or labeled, not so marked, branded, stamped, or labeled, shall be guilty of a misdemeanor, and on trial for such misdemeanor proof of the sale or offer or exposure alleged, shall be presumptive evidence of knowledge of the character of the article so sold or offered, and that the same was not marked, branded, stamped, or labeled as required by this Act.

In what manner best to enforce this matter upon the attention of legislators does not clearly appear. In all the dairy States of the East

they have dairymen associations, which easily secure the relief by the force of their organization. Their committees bring the evil and this evidence before the Legislature committees, and acts are quickly put through. In this State the dairymen have no organization. One was attempted a few years ago, but no interest was awakened and it died. Now, as there is no central organization to work through, it is probable that meetings of butter producers in the different counties, the proceedings of which could be transmitted to the local representatives, would awaken them to the action needed of them. It is certain that if the evil is allowed to creep in quietly and without arousing the opposition of those whose industry is menaced, it is all that the oleomargarine dealers could ask. There must be agitation of the subject to warn the people and to secure a remedy. There is no time to lose. It is said that about 10,000 lbs. of the counterfeit was brought into this city during 10 days. It is easy to see what will follow if this nefarious traffic is allowed to go unchecked.—*Rural Press*.

### Gold from Sulphurets.

The Greenville (Plumas Co.) *Bulletin*, thus describes the new works of the Plumas National Company:

These works are now able to extract the gold from the sulphurets, of which this mine contains large amounts. The process they are now working is as follows:

The ore is first crushed in the six batteries (30 stamps) from which the pulp passes over silvered plates (where the free gold is caught) to the six Frue concentrators, one concentrator for each five stamps, which separate the sulphurets from the gangue. The sulphurets are then conveyed about 100 ft. to the furnace by a car on a covered tramway. They are then spread out on a drying floor that covers the dust chamber; after being thoroughly dried they are put in the Brunton revolving furnace and thoroughly desulphurized, which takes from eight to ten hours to roast a charge of three tons. They are then discharged on a cooling floor and dampened; then put into the chlorinating tube where the gold is dissolved by the action of chlorine gas, and from there drawn off into precipitation tube, and the gold recovered by precipitating.

The capacity of these works is from four to six tons a day, and as the company have a large quantity of sulphurets on hand, they can be run to their full capacity for a long time. The sulphurets from this mine assay from \$60 to over \$100 per ton, and the yield from this source, in addition to the amount obtained in free gold, will be very satisfactory. The mine is thoroughly opened and immense quantities of ore in sight, and there is no doubt that this will prove to be one of the leading mines in the State.

These works were erected under the immediate supervision of R. M. Wilson, the consulting engineer of the company, who has had a great deal of experience in practical mining operations in this State and Nevada.

This process is working successfully in Nevada, Amador and Tuolumne counties, in this State, but these are the first works of the kind erected in this section, and will be the means of largely increasing the gold productions of this county, as nearly all the quartz ledges carry sulphurets—some of them very rich—that heretofore have been lost.

**GOLD AT WEST POINT.**—A correspondent of the *Calaveras Chronicle*, writing from West Point, in that county, says: The progress of our mountain town still continues, although the capitalists are a little backward with their investments in our mines. We keep working along, developing to the best of our ability our own mineral resources, which, some day, will take rank among the foremost in the State. There are too many rich quartz ledges to be left idle if we stop. Therefore it behooves us to use a little exertion ourselves, or as the saying is, "Give up the ship." The true, prospectors are scarce in our vicinity, and so are means. But these prospectors that are left with us are commencing to develop our mines in a more substantial manner than formerly. Not having much means, they have to economize and take what machinery they can get to start with, which accounts for the slow development of mines. There are a great many men who have lived in West Point, and in fact worked in our mines, who are under the impression that the gold never goes down to any depth in our quartz veins, and I myself have been told some years ago that the gold gave out when it reached hard ground, which at the time I believed was the case, and like many others, never followed them far enough to find out. But in the course of time, the croppings were nearly all worked out and the only chance left, was to leave the place or follow them down. Many prospectors took the first part and left, while others, with myself, took the latter course and solved the problem, and found instead of the gold going down, it came up from below, either in the form of pockets or chimneys.

The army appropriation bill, which is nearly completed by the House sub-committee, will not differ materially from that of last year. It will make appropriations on a basis of an army of 25,000 men, and according to the present intention, will not propose any legislation for reduction or reorganization.

### The Wood River Country.

A correspondent of the *Idaho Statesman* gives the following intelligent description of the Wood River country, which is attracting considerable attention: Since my return to Boise City almost every one I have met has asked me the question "Is Wood River going to be a good camp?" How few they are even in our own Territory who realize the extent of territory embraced within the region throughout which the recent discoveries of silver ores have been made, and known by the general name of quite a volume to contain a minute description of the Wood River country. It would require of that entire region, but with your permission I will give the following glance at the general outlines of that vast extent of country. A personal observation of a great portion of the country embraced within its limits, leads me to believe that there are three distinct mineral belts, (perhaps four) running through the entire region, which for the sake of convenience I will confine to the discoveries made within the last two years; beginning at the southeast corner, here we find ourselves on the Blackfoot stage road, in what is known as the Dead Man's Flat, about 35 miles east of the town of Bellevue and on the margin of the lava beds which lie between the Snake river and the mountains.

Turning our face to the northwest we find a mineral belt from 3 to 8 miles in width, extending through the mountains in a northwesterly direction and easily traced for a distance of 60 miles, with fine lodes of galena and carbonate ores located and being developed every few miles for the entire distance. This belt, at the northern end, terminates in the Kinnickinick and Bay Horse districts of Upper Salmon river and contains many of the finest prospects in the country.

From this main mother belt there are branches on either side running off toward the Lost river on the east and Little Wood river on the west, near each of which streams there are some fine locations. West of this belt, and running parallel with it at a distance of about 20 miles, you find another belt which crosses Little Wood river about 10 miles above the stage road, and in its northern course it cuts the headwaters of the East Fork of the Big Wood river and crosses to the East Fork of Salmon river, some 20 miles east of Galena City and extending in the direction of Bonanza City. The Paymaster and some 10 or 12 other lodes on the East Fork of Big Wood river are on this belt, besides a number of very fine locations on the head of the East Fork of Salmon river. Much of this belt is yet unexplored.

Some 10 miles west of the last mentioned belt we find another mineral belt running parallel with those already mentioned, although not so well defined. There are several mines located on various portions of it near and a little east of Bellevue, also on the head of Indian Spring creek. The celebrated North Star mine, the Truant Boy, the Elk Horn and a number of other fine mines are on this belt. I do not know that it has been explored to any considerable extent north of Ketchum.

Travel still westward six or eight miles and we come to the group of mines around Jacob's City, where we find a mineral region several miles wide, extending through Bullion, Deer Creek, Greenhorn, Warm Spring creek, Galena City, and extending through the mountains in the direction of Bonanza City. Upon this belt are situated many of the best developed and richest mines in all this country. The Star, the Idahoan, the Bullion, the O K and many others are on the southern end of the belt, and the White Cloud, the Gladiator, the Eunice and others are near Galena City on the northern end.

Again travel 8 or 10 miles west, and you find still another belt, which is several miles wide, running in the same direction from the foothills north of Big Camas prairie, through the headwaters of the Smokies and through the Saw Tooth district. This belt, when thoroughly prospected, may prove to be one of the richest yet discovered. A number of very fine lodes of galena ore were discovered late this fall on the head of the Smokies, and as we follow it in its northern course we find the ore changes from galena and carbonates to sulphurets, bromides and chlorides. The Smiley mine, the Vienna, the Pilgrim, the Lucky Boy and many others are on this belt, the ore of many of which will yield from \$500 to \$5,000 per ton. True it will be seen that Wood River, if only "a camp," is quite an extensive one, covering an area of country nearly 60 miles square.

In describing these belts, your correspondent would not be understood as saying that there are continuous lodes of ore to be seen in all places on the belts, but that the formation is mineral bearing, and ledges are found in all of them at intervals of a few miles, and in many places good locations have been made within a very short distance of each other for miles along the belt. Some recent discoveries give reason to believe that there is still another belt west of those already discovered and running from Big Camas prairie through the mountains to the north, and that when fully developed it will prove to be a continuation of the great Atlanta mineral belt. Mr. A. Thompson, while surveying in this region only a few days since, found a large vein of gold and silver-bearing quartz similar to that of the Atlanta mine, and his party claim that there are many indications of a large mineral belt running in the direction of that place. If this proves true, it will make an

addition of some 30 miles to the width of our Wood River "camp." As to the richness and quantity of the ores, it will suffice to refer to the smelters at Salt Lake City, which are now receiving hundreds of tons of ore and giving returns of from \$100 to \$700 per ton. Besides there are thousands of tons of lower grade ore on the dumps and in sight in the mines which will pay well for reducing when smelters are erected within a reasonable distance of the mines.

### Drake District.

A correspondent of the *Bodie Free Press* gives a description of the Drake mining district, on Rough creek, Mono county. The district is situated seven miles from Bodie in a northeasterly direction, the mineral belt extending some five miles in length to two and a half in width. Rich croppings meet the eye in every direction. A wagon road has been built from the mines to the divide on the Bridgeport road, which makes it easy of access. Cottonwood creek, a stream running through the district and large enough to run a 20-stamp mill, is also another advantage to the camp. A mill site has been located, also a town site. A large number of prospectors are now engaged in their several claims doing work enough to hold them, and waiting for the inroads of capital to develop the mines.

Among the number of claims visited by your correspondent was the Pay Roll, a mine owned by Rodgers, Freer & Co. This company has run a tunnel into the hill some 65 ft., cutting a fine ledge showing free gold. Assays taken from this ledge show gold \$75; silver \$25.50. Following the ledge the company has sunk a shaft some 35 ft. in depth, the ledge widening as downward progress is made.

The Snow Storm, another mine owned and worked by B. F. Sanders of Bodie, but upon which little development has been made so far, shows a strong ledge two and a half ft. in width. Assays taken from this mine show gold \$45; silver \$15. This mine is in a very favorable location and only needs capital to develop it into a paying property. A number of mines equally as good as the above were visited, and I must say were capital to take hold of some of them Drake district would head the list of hullion producing sections.

**ALL ORES WILL BE REDUCED.**—We learn from the *Carson Appeal* that the ore reduction works which it is proposed to erect in Carson are not intended strictly for the treatment of melting ore, but for the reduction of ores of every class and character which cannot be profitably or successfully handled in the districts in which they are contained. Carson has cheap wood and plenty of water, and will soon have cheap railroad communication with the outlying mining districts. The works ought to be a success, and they will be if put in charge of a practical man. Put them under the control of a scientific individual and they will be a failure. A scientific metallurgist has never yet made a success in Nevada, but practical men who have had experience in smelting, leaching, chlorination and amalgamation have never failed. Science is a grand thing in the abstract; but, as applied to mining and ore reduction, it is a wretched failure in practice. We advise the Carson people to send to Eureka for their smelter, to Colorado for their leacher, to Austin for their chlorinator and to Virginia for their superintendent. But by all means let them give the Freibergers a cold shoulder. The Freibergers are some of them good miners; they know the constituents of ores and are competent mineral chemists, but they know as much about running mills and furnaces in this country as Bob Ingersoll knows about beaven.

**THE WALKER RIVER FURNACE.**—The melting furnace at the Walker River copper mines will be ready to go into operation in about three weeks. As yet there is no charcoal at the furnace. Coal is now being burned, however, and will be ready by the time the furnace is completed. There is in the vicinity an abundance of wood suitable for coal. Besides the rich veins of copper ore there are in the neighborhood many large ledges of silver-lead—argenteriferous galena. Also, there are good veins of gold-bearing quartz, and in conjunction with the copper in some veins are found nickel and cobalt. This is a very interesting mining region, and is destined to give employment to many miners when reached by the Carson and Colorado road, which will be in a very short time. In case the furnace about starting up shall prove a success, there will be erected. There is likely to be seen a smelting center—a place of many furnaces—somewhere in this region; probably on the shore of Walker lake. With cheap fuel for the furnaces there are whole mountains of copper ore that could be smelted. It would be worth millions to this region could lignite or any other coal that would coke be found near at hand.—*Virginia Enterprise*.

They have an expeditious way of paying off the employees on the Hudson River railroad. Last Thursday the paymaster went over the road, paying out \$150,000 in greenbacks and gold. The train ran at its highest speed, and the pay of flagmen between stations was put in envelopes attached to tickets, and was thrown at the various flagmen as their shanties were passed. In this way some \$15,000 was thrown from the pay car as the train was going at the rate of nearly a mile a minute.



## Montana Reduction Works.

A correspondent of the Salt Lake Tribune, writes from Wickes, Montana, as follows:

Twenty miles south of Helena, and four miles west of the Overland stage route, is located the new town of Wickes, that is destined to assume an important position among the prominent mining towns of the great West. Here the Alta Montana company transact their business of mining and reducing ores, and this company has already assumed such importance that a description of their mines and works will be of interest. After the discovery of the Alta mine, a company was formed in 1876, and the organization becoming perfected, work has since progressed in the erection of works and opening up their mines.

The works consist of the following machinery, very nicely located for doing just such work as is required. In a large stone and brick building there is in operation a full set of Krom's machinery for dry concentrating such ores as are best worked in that manner. The ore is taken in at the upper part of the mill which is set partly in the hill, and then falls by gravity, first into a large Blake crusher, then passes between a pair of Cornish rollers, in turn passing through another similar set of rollers below, thus being brought to that degree of fineness required for successful working by the separating machinery. This ore is then elevated to the top of the building from which it descends, through spouts, to the 24 Krom machines which take out the worthless silica and reduce the ore down to one-third or one-fourth the original bulk and at the same time separates the good ore into four different sizes and qualities. This separating or concentrating is done by air jets, and the dust is drawn up by suction pans and carried outside, thus making the works pleasant for the men to work in. The machinery is propelled by an engine of 100-horse power, and the concentration is done at a cost of less than \$2 per ton. The ores thus treated contain so much silica, that smelting would be expensive did they not first get rid of that silica by concentration. Just below the concentration works is located the smelter. When the present company took hold of the property the old smelter was much changed, and now they have in operation a water-jacket cupola capable of working 25 tons of ore per day. It is their custom to mix the ores of their various mines so as to get the best results at the least expense of fuel and labor, and such ores as do not readily yield to the smelter are treated in the battery of five stamps and in their rotary and reverberatory furnaces. The works are provided with three Bruckner revolving cylinders six ft. in diameter and 12 ft. long for chloridizing, two reverberatory furnaces, 13 by 69 ft., and one 9 by 44 ft., and they also have a refining furnace for separating lead from silver, and two amalgamating pans and all other necessities for complete silver reduction works to treat ores by smelting and by amalgamating, and they are now putting up four more which will be each 11 by 40 ft. The works are now turning out five car loads of bullion per week, which bullion runs 360 ounces silver and \$85 in gold per ton, making each car load worth from \$3,000 to \$6,000. But in a few days this output will be greatly increased, in fact, more than doubled by the completion of the new smelter adjoining, with its water-jacket stack capable of working 40 tons of ore per day, and with its other auxiliary machinery.

After we had looked at such complete works and seen the rich yield, the question naturally comes, "Whence comes all these ores?" At a distance of one and a fourth miles we reach the Alta mine. We find the vein varying in thickness from 4 up to 15 ft. of pay ore, embracing galena, carbonate and chloride, that assays on an average 60 ounces of silver per ton. The vein has been opened on the surface and underground a distance of 1,000 ft. The ores are carried by a tramway down the mountain side to a point near the reduction works. The Comet is the farthest away from the works of any of the mines owned by the company, being distant four and a half miles, has more galena with carbonates, and the vein ranges from 6 to 18 ft. in width—assaying from 40 to 125 ounces in silver. The mine has 1,100 ft. of tunnel, and large water concentrating works are being put in of the Frayer & Chalmers pattern, capable of reducing 25 tons of ore per day. This will make the entire product of the mine available and do away with hand sorting.

The Northern Pacific is another good mine owned by this company, upon which 1,000 ft. of tunnels have been run.

The Custer is a new mine of high grade, and well-defined ledge, some of the ore going as high as 400 ounces silver. Besides their own mines the company has lately issued a price list to try the ores mined by other parties, and now the miners have a home market that will induce steady development of the numerous mines located in all directions near Wickes. The works are located in the center of a large and rich mineral district, and will grow in importance as the mines are opened up. The company had trouble to get iron ore to use in fluxing, so they let their want be known and in a short time they were flooded with rich specimens lying almost at their door. The cost of delivering ores from the mines to the works, range from 90 cents to \$3 per ton, and with new facilities, even these low figures will be somewhat reduced.

## USEFUL INFORMATION.

**VINEGAR.**—A method employed in France, which converts cider or other liquid into vinegar much more expeditiously than do ordinary practices, prefaces the process with preparing the barrels or casks by first scalding them with water and next pouring into them boiling vinegar, rolling the barrels, and allowing them to stand on their sides two or three days, until they become thoroughly saturated with the vinegar. This preparation over, the barrels are filled about one-third full with strong, pure cider vinegar and two gallons of cider. Every eighth day thereafter two gallons of cider are added until the barrel is two-thirds full. In 14 days after the last two gallons are added the whole will have been converted into vinegar, one-half of which is now drawn off and the process of filling with cider begun again. In summer the barrels during the process of conversion are exposed to the rays of the sun, and in cold weather are stored where a uniform temperature of about 80° can be maintained.

**UTILIZING VULCANIZED RUBBER.**—The utilization of old vulcanized caoutchouc is effected by Heyer, of Berlin, in the following way: Old used-up buffer-rings of railway carriages are heated, in presence of steam; the sulphur distills off, the caoutchouc melts and flows in hot water, collecting at the bottom of the vessel. The steam prevents burning of the material. The melted caoutchouc has essentially different properties from what has been supposed. It becomes a pretty thin, dark mass which remains liquid even at ordinary temperature, soon dries in air, and retains its property of being water-tight. On the other hand, it parts with its elasticity, at least for large pieces. Heyer uses this liquid caoutchouc chiefly for making water-tight coverings for road or railway carriages, awnings for ships, etc. It is recommended also as a water-tight varnish for iron wares.

**GLYCERINE AS AN ILLUMINANT.**—Pure glycerine, it is said, may be burned in lamps, provided the wick is so arranged that it shall not be elevated above the surface of the liquid, as the viscosity of the substance will not permit of its being fed upwards by capillary attraction. The flame of glycerine, like that of alcohol, is almost colorless. Glycerine, however, is easily mixable with a variety of substances that will impart luminosity to the flame, and a number of substances rich in carbon may be added to it for that purpose. It is not improbable that circumstances might arise where these facts would be useful.

**IMPROVED MORTAR AND ARTIFICIAL STONES.** M. Decourneau attributes the cracks in common mortars and cements to the uncombined quicklime that they contain. In order to neutralize the lime, he uses an *agregat* composed of a very fine silicious powder, mixed with diluted nitric acid. He thus obtains mortar with much greater, more uniform and more lasting resistance than those hitherto used. The application of his method, especially in the new forts of Paris, has given excellent results, without a single failure. Stones made by his process may be sawed and chiselled like natural stone.

**HOW TO USE OIL-STONES.**—Instead of oil, which thickens and makes the stones dirty, a mixture of glycerine and alcohol is used by many. The proportions of the mixture vary according to the instrument operated upon. An article with a large surface, a razor, for instance, sharpens best with a limpid liquid, as three parts of glycerine to one of alcohol. For a grinding tool, the cutting surface of which is very small, as is also the pressure exercised on the stone in sharpening, it is necessary to employ glycerine almost pure, with but two or three drops of alcohol.

**JAPANESE HAND SAWS** cut on the pull stroke, so that no matter how hard the wood or dull the saw, they will not bend or huckle. It is rather more difficult to saw to line with such saws than with ours, but they have their advantages. Take a key-hole or compass saw, cutting on the push or shove stroke—what an aggravating, awkward thing it is! Now point the teeth the other way, and you have a tool that will keep stiff no matter how many knots it encounters or how dull it gets. In other words, the pull-stroke of 3,000 years ago is the best for thin narrow blades.

**UTILIZING RIVER CURRENTS.**—In parts of Germany it was usual to anchor boats in river currents, with large paddle wheels to be turned by these currents and used in grinding corn, but with this cheap power there was an inconvenience in conveying the corn to and from the boats. It is now proposed to re-adopt these old floating mills for the driving of dynamo-electric machines from which light or power may be transmitted to the shore.

**TO MEASURE A COIL OF BELTING.**—Add the diameter of the hole, in inches, to the outside diameter of the roll; multiply by the number of coils in the roll; then multiply this by the decimal .1309, and the product is the number of ft. in the roll. To have the exact length, the average diameter is to be used if the roll is not perfectly round, and the fractional parts of an inch must not be omitted in the calculation.

**TANNING.**—A process of improved tanning for the improved treatment of leather, is described in the technical journals. It appears in this process iron salts were originally resorted to, but no practically successful results could be obtained with it, the iron salts being found to attack the leather fiber, destroying its durability. The addition of chrome was found to be a great improvement, but the chrome and salts became partially dissolved by moisture, thus rendering it necessary to protect, by an absolutely non-soluble coating, the fibers of the leather. This end was at last attained by producing an iron and chrome soap, and it is by using this compound in a manner adapted to the purpose in view that the material is prepared, the appearance being that of ordinary leather, though somewhat lighter than bark-tanned hides. Some experiments are reported to test the value of the article produced by this method, the results proving very satisfactory; that is, the tensile-breaking strength of several specimens was found to average some 4,550 lbs. per square inch, which is about equal to that of good bark-tanned leather, the improved fabric also showing a remarkable resistance to the absorption of water.

A WRITER in the Providence Journal predicts a useful future for the milkweed, which has heretofore been considered only a cumber of the ground. Its seeds yield a finer oil than linseed; its gum can be used in place of India rubber, and from its floss a fabric resembling Irish poplin has been made; while the young shoots are used in the spring by some people instead of asparagus, which they resemble in flavor. Now, pertinently adds the writer, if uses can be discovered for the thistle and white-weed, they may prove friends in disguise.

**TO PREVENT SOOT FROM ACCUMULATING.**—The *American Builder* says the accumulation of soot may be prevented by putting a quantity of salt into the mortar with which the intercourses of brick are to be laid. Then there will never be any accumulation of soot in that chimney. The philosophy of it is thus stated: The salt in that portion of the mortar which is exposed, absorbs moisture from the atmosphere every damp day. The soot thus becoming damp falls into the fire-place.

**RHUBARB TEST PAPER.**—M. Lacour has invented a new test paper. He adds to powdered rhubarb twice its weight of liquid ammonia, and after maceration for a quarter of an hour filters the liquid. Strips of paper dipped into it are dried, and are of a red purple color. These, when touched with acids become of a lemon yellow, and with alkalis their former color. It is said to be a very sensitive test.

## GOOD HEALTH.

## Consumption.

Consumption usually begins with a slight, dry cough in the morning, then, on going to bed, getting more and more frequent, with more and more phlegm, increasing debility, thinness of flesh, shortness of breath, and quickening pulse. In fatal cases its average course is about two years; hence the importance of arresting the disease at as early a stage as possible, and the sooner rational means are employed for this purpose, the greater the chances of success.

The disease is owing to an irritation commencing in the throat and extending to the lungs, so that their action is interfered with, and the blood does not receive sufficient oxygen to purify it. The first thing to be done is to remove the obstruction, which is the irritation or congestion of the lungs. Four ounces of glycerine, two ounces of alcohol, two ounces of water and one grain of morphia make an excellent mixture for relieving the cough. It should be taken in doses of two teaspoonfuls every two hours until the cough is relieved.

The chest, just below the neck, should be rubbed with tartar-emetic ointment every morning over a space as large as the hand, until a thick crop of sores is brought out; then rub the ointment between the sores to bring out a new crop. Meantime the patient should take regular and vigorous exercise in the open air. There is nothing that equals horseback riding as a remedy for this disease. If a consumptive were to "live in the saddle," and sleep out of doors, taking care to keep the feet dry and warm, and to live upon good, nourishing food; in short, to "rough it," he would recover his health in a few months, even if the disease had made considerable progress. The trouble is that it requires a strong will to carry out so severe a course, in spite of the languor and debility which disposes an invalid to quiet dependency.

The most marked sign of lung disease is emaciation; and the most positive indication of returning health is increase in weight.—*Hall's Journal of Health.*

**SIMPLE SURGERY.**—A simple and usually successful mode of extracting a needle or any piece of steel or iron that has broken off in the flesh is by applying a common pocket magnet. Iron filings have a way of imbedding themselves in the eye which defies almost every ordinary means for their extraction. For their removal a small, blunt-pointed bar of steel, well magnetized, will be found effectual.

## Colds.

A cold in the head can usually be cured in a few hours if, as soon as discovered, the person will sniff the fumes of ammonia or spirits of camphor every few minutes as strong as they can be borne. When a severe cold attacks the throat and lungs, there is no safety in neglecting it for an hour, for there is more or less inflammation of the lungs, which interferes with their action, rendering them liable at any moment to take on serious and, possibly uncontrollable disease. Go home and remain there. In the evening take a warm foot bath, and at bed time take three or four liver pills. These will stimulate the liver to healthy action, and promptly relieve the lung trouble; but it renders the system sensitive to renewed attacks, and, therefore, the greatest care should be observed for several days not to take fresh colds. Ordinarily, no other treatment is necessary; but, should the cough continue, have your druggist make the following mixture, and take one or two teaspoonfuls every four hours till cured: Glycerine, 4 ounces; whisky, 4 ounces; morphia, 1 grain. Sore throat can be promptly relieved by applying a mustard plaster, or "mustard leaves," on the front of the neck, over the sore spot. In addition the throat and mouth may be frequently gargled with the following mixture:

A teaspoonful of salt, a pinch of red pepper and a tablespoonful of vinegar. If found too strong add a little water. A portion of the gargle may be swallowed, or sipped, little at a time.

Sweating has been quite generally recommended in the cure of colds. I think, however, that the risk of taking cold afterward will more than counterbalance the good that may be expected, and, except in cases of unusual severity, I would not recommend it.

The "Turkish bath" has been highly recommended as a cure for colds. With proper care afterward, there is no hotter or more effectual plan of cutting short a severe cold. It is not, however, necessary to go to a regular establishment to take such a bath. Any small comfortable room, where a good fire can be quickly made, will answer the purpose. In the early evening make a good fire in the stove and close the doors and windows, leaving only small openings for ventilation. Then let the patient put on his night clothes and lie down on a bed or sofa, or sit in an easy chair for an hour or more, with the temperature of the room from 90° to 100° F. Afterward the room should be gradually cooled to about 70°, and the patient should go to bed and remain there till morning.—*Hall's Journal of Health.*

## Night Air.

An extraordinary fallacy is the dread of night air. What air can we breathe at night but night air? The choice is between pure night air from without and foul air from within. Most people prefer the latter—an unaccountable choice. What will they say if it is proved to be true that fully one-half of all the diseases we suffer from are occasioned by people sleeping with their windows shut? An opened window most nights in the year, can never hurt any one. This is not to say that light is not necessary for recovery. In great cities night air is often the best and purest air to be had in 24 hours. I could better understand shutting the windows in town during the day than the night, for the sake of the sick. The absence of smoke, the quiet, all tend to make night the best time for airing the patient.

One of our highest medical authorities on consumption and climate has told me that the air in London is never so good as after 10 o'clock at night. Always air your room then from the outside air if possible. Windows are made to open, doors are made to shut; a truth which seems extremely difficult of apprehension. Every room must be aired from without, every passage from within. But the fewer passages there are in a hospital the better.—*Florence Nightingale.*

**DANGER FROM DISUSED HOUSES.**—Houses that have been empty may become fever breeders when they come to be reoccupied. An English sanitary officer alleges that he has observed typhoid, diphtheria, or other zymotic affections to arise under these circumstances. The cause is supposed to be in the disuse of cisterns, pipes and drains, the processes of putrefaction going on in the impure air in them, the unobstructed access of this air to the house, while the closure of windows and doors effectually shuts out fresh air. Persons moving from the city to their country homes for the summer should see that the drains and pipes are in perfect order, that the cellars and cisterns are cleared of rubbish, and the whole house thoroughly aired before occupying. Carbolic acid used freely in the cellar is a good and cheap disinfectant.

**ANTIDOTE TO POISON.**—If a person swallows any poison whatever, or has fallen into convulsions from having overloaded the stomach, an instantaneous remedy, most efficient and applicable in a large number of cases, is a heaping teaspoonful of common salt and as much ground mustard, stirred rapidly in a teacupful of water, warm or cold, and swallowed instantly. It is scarcely down before it begins to come up, bringing with it the remaining contents of the stomach; and lest there be any remnant of the poison, however small, let the white of an egg or a teaspoonful of strong coffee be swallowed as soon as the stomach is quiet, because these very common articles nullify a large number of poisons.



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## The Week.

We begin Vol. XLII of the MINING AND SCIENTIFIC PRESS this week, and we want all our readers to notice it, as it is a fitting time for the renewal of subscriptions. The PRESS will be very much improved this year and no one will regret in assisting us in our good work.

The very copious and general rains are indications of a good and prosperous year for California. The hydraulic miners are all happy and even if the farmers have a little too much water for the present it is better than not enough.

In mining news the most noticeable feature is the closing down of the Eberhardt and Aurora tunnel, at White Pine. Hamilton is a deserted camp. The workmen have been all discharged from the tunnel in which nothing was found though so much was explored. The Eureka Sentinel, in speaking of the abandonment, says: "We are told that the magnificent two-story brick Court-house can be rented by just 'paying the taxes on it.' Who can tell but that some hang-on-a-tive 'cuss' will continue to pick around, develop the ground of all White Pine's glory, and that the town may yet become the leading city of eastern Nevada?"

Among other things a rich strike in a new ore body has been made in the Placerville gold quartz mine, El Dorado county. This mine was formerly the Pacific, and has been owned by an English company for some three years past.

The prevailing topic is the coming of the New Year and it is certain that the State was never in better heart and courage for it. Confidence in future prosperity is general. We hear from the East continued wallings from the croakers who have left us to try their arts on Eastern victims. They say the State is being ruined and they transfer their immense wealth to other fields, where it will be better treated. We do not miss their money; we do not miss the men. Their reports belie the State, for though their day of subtle arts is over, the day of required industry and reward for legitimate enterprise is dawning bright. It will be a good New Year.

## Silver in Curious Places.

During a visit to the State Mining Bureau this week, Mr. Hanks showed us several pieces of unmistakable sedimentary rock, the memorandum upon which was as follows:

"Sedimentary rock found 478 ft. below surface at Redwood City, San Mateo Co., Cal. Said to contain silver. Presented by S. M. B. Haley, well-digger."

And sure enough this rock does contain silver, as this writer saw by means of a glass; little scales of pure silver. How it came there, is this mystery.

But while considering whether the metal had been put on the rock, or whether it grew there, our attention was attracted to a pile of pieces of sandstone lying on the table. Picking up some of the pieces, we saw broad scales of silver upon it. This came from Silver Reef, Utah, and the heat proof that there is silver in that, and that it "grew" there is, that silver bars are coming down, and that the Barbee & Walker and Stormont mines are paying dividends from this sandstone ore.

The Redwood City rock was found while digging a well, and was met with at the depth stated.

At the Bureau we were also shown some specimens of arguerite or native silver amalgam, prescribed recently by R. R. Clark, J. C. Culbreth and J. L. Crimp, who brought it from British Columbia. The district where it is found is in the vicinity of Vital and Mason creeks, in a wild, mountainous region, almost inaccessible, and wholly without roads. Prospecting for coarse gold in the bed of the creeks has proved profitable, although but few miners have gone in, owing to the two or three hundred miles of "packing" necessary. For some time particles of whitish metal have been found with the coarse gold in the pan, after washing, but owing to the ignorance of the prospectors it was always thrown away, as of no value. The above-named miners, who arrived in San Francisco a few days ago, brought specimens of the metal with them, and submitted them to the State Mineralogist for examination. Assays proved the specimens to correspond almost exactly to the "arguerite," found in the mines of Argueros, in Coquimbo, Chile, where it is the principal ore. These mines are enormously rich, and are the sole producers of this peculiar form of silver. In the first 15 years of exploration, the mines afforded 200,000 marks of silver. The arguerite found in the Chilean mines assays: Silver, 86.5; mercury, 13.5 parts to the hundred. The British Columbia specimens now on exhibition at the Mining Bureau assay as follows:

Mercury.....11.90  
Silver.....56.15  
Silicate.....45  
Total.....98.50

The specimens are flat in shape, ranging in size from a quarter of a dollar to the size of a half dime. The larger pieces weigh a quarter of an ounce or more. Mr. Hanks has quite a number of them.

The absence of free quicksilver or quicksilver ores in the waters of Vital and Manson creeks renders impossible the amalgamation of small particles of native silver into larger masses, consequently it is agreed that a deposit, or vein of the amalgamated silver must exist at some point further up the stream. The Planchas de la Plata mine of Arizona may have been formed in the same way. Indeed, many suppose it may have been formed from the Stonewall Jackson mine, as the silver must have come from some such source.

Dana's Mineralogy says "arguerite" occurs with cobalt bloom and a little sulphuret and chloride of silver. It is found in regular octahedrons; also in grains, small masses and dendrites. In color, luster and ductility it is like native silver, only much softer. This ore has never before been found but in one other place in the world.

**COINAGE OF GOLD.**—The Treasury Department has directed the transfer of \$3,999,500 in gold bullion from the Assay Office in New York to the Philadelphia mint for coinage into eagles and half eagles. After the transfer there will still remain in the New York Assay Office about \$63,000,000 in bullion, more than enough to keep the Philadelphia mint employed for six months in coining gold exclusively. As nearly as can be estimated at the present time it is thought at the Treasury Department that the public debt statement for December, which will be issued on Monday, Jan. 3d, will show a reduction about the same as the statement for November, which was \$3,609,000. During this month about \$4,000,000 has been paid on account of pensions.

The Nevada Transcript says: During the month of November the Milton gravel mine yielded bullion to the amount of \$52,900; North Bloomfield gravel, \$31,900; Idaho quartz, \$41,600. These three mines are among the leading ones in Nevada county. There are 12 or 15 others here that make almost equally as good showings, but being close corporations it is impossible to obtain facts as to their outputs.

The Carson reduction works propose to treat ores by the leaching as well as by the smelting process.

## Selling Mines.

Within the past two years a great many men have gone from this coast to the Eastern States to sell mines. Not one in fifty of them were successful. Too many came at once, and too many thought the Eastern people would buy anything that came along, providing the specimens were rich enough. The New Yorkers did not bite as easily as they were expected to, which was a good thing for them in many instances, for more than one worked-out or played-out mine was offered for sale on a basis of statements far from the truth.

Now, although these men who spent their money and time as mining missionaries did not reap great rewards themselves, their labors have borne fruit. Attention was called to mining matters, and thousands of Eastern people have begun to claim something about mines. They have invested all over the country, more particularly in Colorado, however. They are now buying up property in Arizona, New Mexico and Idaho.

It is pleasant to note, moreover, that California has not been neglected. A number of Eastern private companies are operating in this State now, and many proprietors have been sold this year to Chicago, New York and Boston companies. Most of the mines purchased have been those what were developed and opened subsequently for the purchasers to see what they were buying. No fancy prices were paid either. In fact we notice the Eastern people are taking kindly to our drift mines, and many pieces of that kind of property have changed hands of late. In regard to the prospect of selling mines, the New York World says it is easier to do it now in New York than it was six months ago. It says: "There is not this boom which made the Fifth Avenue Hotel a mining rendezvous, a year ago, but there is not the horror of the word 'mine' which was felt after Little Chief joined Chrysolite and Pittsburgh in its farewell to dividends. Mining is on a better basis than it has been before in this city. Capitalists are willing to invest in good mines, but they wanted to be assured that they are good. Large sales of mining property have been negotiated during the past month with noticeable ease. A man who came here recently with a 20-day bond on a \$200,000 property closed a bargain within 10 days after his arrival. It was, however, an extra bargain. There is less disposition to overcapitalize than there was a year ago, and a diminished tendency to stacking mines at all. Sales this winter seem to be largely to men who are not in for a stock deal, but who propose to work the properties bought. The revival of some of the properties which have been under a cloud, and the genuinely rich developments of the past season in Colorado, Arizona and New Mexico have had an excellent effect in restoring that desideratum, a cautious confidence in mining properties."

## Idaho Mines.

New Mexico and Arizona are preparing for a "boom," in the spring, and already many miners are flocking to the several districts in these Territories. Idaho, too, is attracting a good deal of attention, and will attract more next year. Most of those who are thinking of investing there are from the East, and in view of the fact that Leadville has helped to give Colorado a sort of black eye this summer, Idaho will come in for a greater share of attention than formerly, and take, in some measure, Colorado's place.

Here in California it would be hard to do anything with Idaho mines. Not that the mines are not as good as others, but that former experiences were not happy ones. And it was not the fault of the mines, either, so much as the reckless and dishonest management, which brought discredit on all mining transactions in the Territory. The War Eagle Mountain mines, which have been so prominently before the people, and which were managed as gigantic steals, sickened our whole community. The actions, which occurred at Owyhee, disgusted everybody so that an Idaho mine could scarcely be given away.

Eastern people have not had these experiences, and will not have them. They will take hold of the mines themselves and work them, and we are not likely to hear of such awindles as formerly occurred. Many new districts have been opened in Idaho within the past few years, and the Territory is rapidly coming to the front as a bullion producer. The Yankee Fork Herald is quite sanguine as to the prospects of the Territory. It says:

That Idaho is destined, during the next two or three years, to step to the front as the greatest mining country in America, there is no question. She would have been much farther advanced to-day had not last winter been so severe. A good many orders will be given before spring for large mills and smelters, and the revival of mining interests will be general throughout eastern Idaho. The mines are known to be rich and all that remains now is for things to assume a proper shape for the rapid development and working of the mines. From all the mines worked the bullion product has been even better than those interested expected, and far above what was looked for by outside capitalists.

## Physical Studies of Lake Tahoe.—No. 1.

[BY PROF. JOHN LE CONTE.]

### Relation of Temperature to Depth.

By means of a self-registering thermometer (Six's) secured to the sounding-line, a great number of observations were made on the temperature of the water of the lake at various depths and in different portions of the same. These experiments were executed between the 11th and 18th of August, 1873. The same general results were obtained in all parts of the lake. The following table contains an abstract of the average results, after correcting the thermometric indications by comparison with a standard thermometer:

Abstract.	Depth in feet.	Depth in Meters.	Temp. in Fahr.	Temp. in Cent.
1	0-Surface	0-Surface	67°	19°.44
2	5	15.24	63°	17°.22
3	100	30.48	55°	12°.73
4	150	45.72	50°	10°.00
5	200	60.96	43°	5°.89
6	250	76.20	47°	8°.33
7	300	101.44	46°	7°.78
8	330*	100.68	45°.5	7°.50
9	400	120.92	45°	7°.22
10	480*	146.30	44°.5	6°.94
11	500	152.40	44°	6°.67
12	600	182.88	43°	6°.11
13	772*	235.30	41°	5°.00
14	1506*	459.02	39°.2	4°.00

\* Bottom.

It will be seen from the foregoing numbers that the temperature of the water decrease with increasing depth to about 700 or 800 ft. (213 or 244 meters), and below this depth it remains sensibly the same down to 1,506 ft. (459 meters). This constant temperature which prevails at all depths below—say 250 meters—is about 4° Cent. (39°.2 Fahr.). This is precisely what might have been expected; for it is a well-established physical property of fresh water that it attains its maximum density at the above indicated temperature; in other words, a mass of fresh water at the temperature of 4° Cent. has a greater weight under a given volume (that is, a cubic unit of it is heavier at this temperature) than it has at any temperature either higher or lower. Hence, when the ice-cold water of the snow-fed streams of spring and summer reaches the lake, it naturally tends to sink as soon as its temperature rises to 4° Cent., and conversely, when winter sets in, as soon as the summer-heated surface water is cooled to 4°, it tends to sink. Any further rise of temperature of the surface water during the warm season, or fall of temperature during the cold season, alike produces expansion, and thus causes it to float on the heavier water below; so that water at 4° Cent. perpetually remains at the bottom, while the varying temperature of the seasons and the penetration of the solar heat only influence a surface stratum of about 250 meters in thickness. It is evident that the continual outflow of water from its shallow outlet cannot disturb the mass of liquid occupying the deeper portion of the lake. It thus results, that the temperature of the surface stratum of such bodies of fresh water for a certain depth, fluctuates with the climate and with the seasons, but at the bottom of deep lakes it undergoes little or no change throughout the year, and approaches to that which corresponds to the maximum density of fresh water. Analogous results were obtained, nearly a century ago, from the observations of Horace Benedict De Saussure in the Swiss lakes by means of a thermometer of his own invention. The following table contains De Saussure's results (Ann. de Chim. et de Phys., second series, Tome 5. Page 403. Paris, 1817):

Lake.	Month.	Temp. of Surface.	Depth in Meters.	Temp. at Depth.
Geneva.....	August.....	21°.20 C.	49	6°.10 C.
Geneva.....	February.....	5°.63 "	309	5°.33 "
Constantine.....	July.....	17°.50 "	127	4°.25 "
Briancon.....	July.....	20°.00 "	162	4°.75 "
Thun.....	July.....	18°.75 "	114	5°.00 "
Neuchâtel.....	July.....	23°.10 "	106	5°.00 "
Lucerne.....	July.....	20°.00 "	195	4°.83 "
Bienne.....	July.....	20°.70 "	71	6°.90 "
Anney.....	May.....	14°.53 "	53	5°.56 "
Bourget.....	October.....	17°.53 "	78	5°.33 "
Maggiore.....	July.....	25°.00 "	109	6°.75 "

It is evident that the results of the experiments of the distinguished Swiss physicist, although executed with an imperfect thermometric instrument, in a general sense afford a striking confirmation of the deduction from my observations in relation to the distribution of temperature at different depths in the waters of Lake Tahoe.

### Why the Water Does not Freeze in Winter.

Residents on the shores of Lake Tahoe testify that, with the exception of shallow and detached portions, the water of the lake never freezes in the coldest winters. During the winter months the temperature of the atmosphere about this lake must fall as low, probably, as 0° Fahr. (—17°.78 Cent.). According to the observations of Dr. Geo. M. Bourne the minimum temperature recorded during the winter of 1873-4 was 6° Fahr. (—14°.44 Cent.). As it is evident that, during the winter season, the temperature of the air must frequently remain for days, and perhaps weeks, far below the freezing point of water, the fact that the water of the lake does not congeal has been regarded as an anomalous phenomenon. Some persons imagine that this may be due to existence of subaqueous hot springs in the bed of the lake—an opinion which may seem to be fortified by the fact that

\* Similar confirmatory results were obtained by Sir H. T. de la Beche, in 1819-20, by means of a self-registering minimum thermometer. Thus he found (Ann. de Chim. et de Phys. Second Series, Tome 19. Page 77 et seq. Paris, 1821):



"hot springs" do occur at the northern extremity of the lake.

Lake.	Month.	Temp. of Depth in Surface.	Temp. at Meters.	Temp. at Depth.
Geneva.....	September....	19°.5 C.	23	11°.6 C.
Geneva.....	September....	19°.5 "	62	7°.3 "
Geneva.....	September....	19°.5 "	62	6°.6 "
Geneva.....	September....	19°.5 "	140	6°.4 "
Geneva.....	September....	19°.5 "	241	6°.4 "
Geneva.....	September....	19°.5 "	300	6°.4 "
Thun.....	.....	15°.6 "	192	5°.3 "
Zug.....	.....	14°.4 "	70	5°.0 "

But there is no evidence that the temperature of any considerable body of water in the lake is sensibly increased by such springs. Even in the immediate vicinity of the "Hot springs" (which have in summer a maximum temperature of 55° Cent., or 131° Fahr.) the supply of warm water is so limited that it exercises no appreciable influence on the temperature of that portion of the lake. This is further corroborated by the fact that no local fogs hang over this or any other portion of the lake during winter, which would most certainly be the case if any considerable body of hot water found its way into the lake. The true explanation of the phenomenon may doubtless be found in the high specific heat of water, the great depth of the lake, and in the agitation of its waters by the strong winds of winter. In relation to the influence of depth it is sufficient to remark that before the conditions preceding congelation can obtain, the whole mass of water, embracing a stratum of 250 meters in thickness, must be cooled down to 4° Cent., for this must occur before the vertical circulation is arrested and the colder water floats on the surface. In consequence, the great specific heat of water, to cool such a mass of the liquid through an average temperature of 8° Cent. requires a long time, and this cold weather is over before it is accomplished. In the shallower portions, the surface of the water may reach the temperature of congelation, but the agitation due to the action of strong winds soon breaks up the thin pellicle of ice, which is quickly melted by the heat generated by the mechanical action of the waves. Nevertheless, in shallow and detached portions of the lake which are sheltered from the action of winds and waves, as in "Emsrald bay," ice several inches in thickness is sometimes found. The operation of similar causes prevents the deeper Alpine lakes of Switzerland from freezing under ordinary circumstances. Occasionally, however, during exceptionally severe and prolonged winters, even the deepest of the Swiss lakes have been known to be frozen. Thus, the lake of Geneva (maximum depth, 334 meters) was frozen in 1762 and 1805. The lake of Constance (maximum depth, 276 meters) was frozen in 1477, 1572, 1596, 1695 and 1830. The lake of Neuchâtel (maximum depth, 135 meters) was frozen in 1573, 1656, 1795 and 1830. The lake of Zurich has been frequently frozen, and although its maximum depth is about 195 meters, yet it is well known that this narrow and elongated body of water is very shallow over a large portion of its area, a fact which sufficiently explains its greater liability to be frozen.

**Why Bodies of the Drowned do not Rise**  
A number of persons have been drowned in Lake Tahoe (some 14) between 1860 and 1874, and it is the uniform testimony of the residents that in no case where the accident occurred in deep water, were the bodies ever recovered. This striking fact has caused wonder-seekers to propound the most extraordinary theories to account for it. Thus one of them says: "The water of the lake is purify itself, but on account of the highly rarefied state of the air it is not very buoyant, and swimmers find some little fatigue, or in other words they are compelled to keep swimming all the time they are in the water, and objects which float easily in other water sink here like lead." Again he says: "Not a thing ever floats on the surface of this lake, save and except the boats which ply upon it."

It is scarcely necessary to remark that it is impossible that the diminution of atmospheric pressure due to an elevation of 6,250 ft (1,905 meters) above the sea level could sensibly affect the density of the water. In fact, the coefficient of compressibility of this liquid is so small that the withdrawal of the above-indicated amount of pressure (about one-fifth of an atmosphere) would not lower its density more than one 100,000th part. The truth is, that the specific gravity of the water of this lake is not lower than that of any other fresh water of equal purity and corresponding temperature. It is not less buoyant or more difficult to swim in than any other fresh water, and consequently the fact that the bodies of the drowned do not rise to the surface cannot be accounted for by ascribing marvelous properties to its waters. The distribution of temperature with depth affords a natural and satisfactory explanation of this phenomenon, and renders entirely superfluous any assumption of extraordinary lightness in the water. The true reason why the bodies of the drowned do not rise to the surface is evidently owing to the fact that when they sink into water which is only 4° Cent. (7.2 Fahr.) above the freezing temperature, the gases usually generated by decomposition are not produced in the intestines. In other words, at this low temperature the bodies do not become inflated, and, therefore, do not rise to the surface. The same phenomenon would doubtless occur in any other body of fresh water under similar physical conditions.

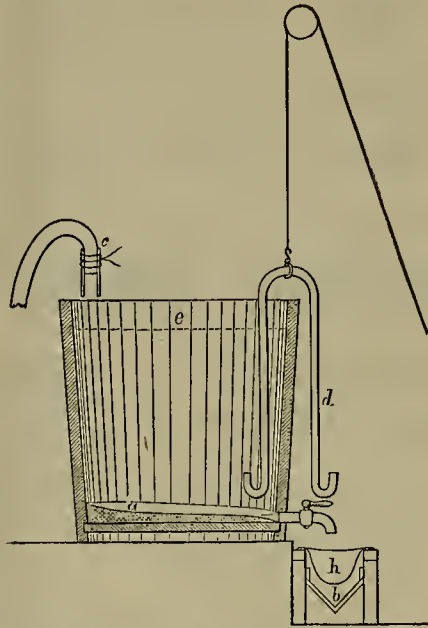
SEVERAL Montana mining properties are about to be incorporated in Salt Lake.

### The California Washer.

Mr. George M. Pursell, of San Joss, Santa Clara county, has recently patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a washing machine which has several advantageous improvements. The machine is one of that class which has a semi-cylindrical-containing body, and a similarly-shaped rubber which is adapted to be oscillated or rotated about an axis, so that the clothes may be rubbed between the two corrugated surfaces.

In this machine the axis, or journal, about which the rubber oscillates, is supported within hinged swinging boxes at each side. Within these boxes is employed a spring, or springs, which press upon the journals from above, and hold the rubber down with any desired tension, while at the same time it is allowed to give and adjust itself to any irregularity in the position of the clothing underneath it. A peculiar-looking device serves to retain the swinging boxes in place, or to release them when it is desired, to remove the rubber for the purpose of attending to the contents of the washer.

The corrugated rubber bars are constructed



### PRECIPITATING VAT FOR OBTAINING THE SILVER IN LEACHING PROCESS.

in a novel way, so that the clothes are operated upon in a peculiar manner. At the same time an escape passage is provided through the bottom for the dirt and sediment without allowing such large spaces that the clothes will pass through and become entangled or clogged.

The rubber can be turned out of the tub about its pivots, when desired.

In the formation of the corrugated surfaces in the bottom of the tub and upon the rubber, various devices have been employed. When wooden bars have been used they must, to be effective, be separated widely enough to enable them to take a good hold upon the clothes. This sometimes allows the clothes to pass through the spaces and to clog the machine, and in order to remedy this, and at the same time to provide the necessary space between the projecting bars to give the proper rubbing action, these have been formed with groove or depression cut in the center, leaving the projection upon the outer edges. The objection to this form is that the dirt will settle in the grooves.

Mr. Pursell's construction of the cross bars is intended to provide a wider space between the projecting rubbing portions of the bars, and at the same time to make the spaces between the bottom of the bars so narrow that the clothes will not work through.

The bars are formed of an L or J shape, the vertical portion projecting up toward the center of the tub, while the horizontal portions of each extend along toward the next bar, and leaves just space enough between to allow the dirt to escape, at the same time the vertical portions are so far separated that they will take a good hold of the clothes and produce a good rubbing action. The bars on the rubber are the same form as those within the tub.

By these improvements the machine is rendered more efficient, is easier to work, and the clothes may be easily inspected or changed without entirely removing the rubber.

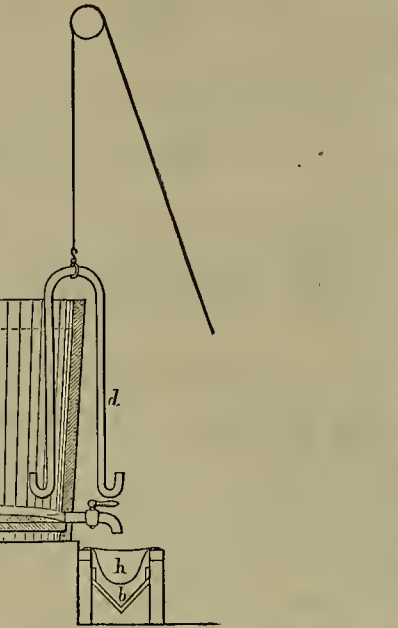
TYNDALL DISTRICT, in the Santa Rita mountains, Arizona, is said to contain undeniably good mines and an abundance of wood and water. Several companies have taken hold of the aforesaid properties and the Santa Rita mountains will soon take a place in the front rank of mining districts in this great and growing Territory. The general formations are granite, porphyry, syenite and limestone. The Jesuits in olden time found native silver in quantities, from which they made various articles of domestic use.

### Precipitation of Silver in Leaching Process.

In the leaching of ores after the processes by which the silver is taken into solution, the brine containing the silver obtained from the leaching tanks, flows through a trough or rubber hose into the precipitating vats. These vats are from five to six ft. high, and four ft. in diameter. One of these precipitating vats is figured in a recent publication,\* and we illustrate it herewith to show the form:

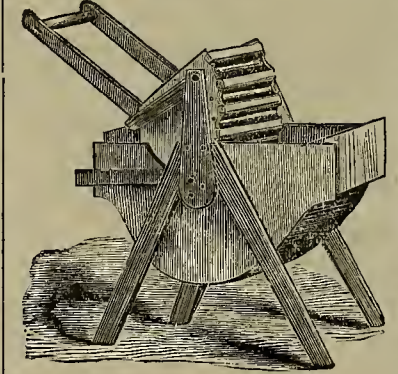
The bottom, *a*, is laid out with Roman cement, and the sides inclining toward the large brass cock, through which the precipitated silver is discharged directly into the filter below—the filter being two ft. wide by three or four ft. long, and from eight to ten inches deep. The solution that runs through the filter falls into the trough, *b*.

According to the capacity of the works, there must be from four to eight of these vats. When the solution, coming from the leaching vats, rises to within eighteen or twenty inches from the rim of the vat, the flow is turned into the next vat, and the precipitation of the first



one commences immediately. For this purpose a bucketful of the sulphide of calcium is poured into the vat, and the silver precipitated. The solution is then stirred vigorously.

Treating always the same kind of ore, the required quantity of the precipitating agent is soon learned. The black precipitate sinks to



The California Washer.

the bottom, and the workman now dips a little of the clear liquid out in a glass tube or tumbler, and adds a few drops of the sulphide of lime. If a dark precipitate or a dark color is produced, it shows that there is still silver in the liquid, and more of the agent must be added; but if, on the contrary, no precipitate is observed, there is either enough or too much of the sulphide. To prove this, some of the silver-holding liquid is added to a test taken from the other tank under treatment. If in this case a precipitate is formed, silver-holding liquid must be carefully added to the liquid in the tank until no reaction is produced. This work, delicate as it seems, is easily learned by the workmen. If a little silver should be left in the liquid, it is not injurious, neither is the silver to be considered as lost, because the same liquid is used over again; but a small excess of the sulphide of calcium would cause a loss in silver, as it precipitates sulphide of silver in the leaching tank in the mass of ore, which is not dissolved again. The precipitation is performed in a short time, requiring about fifteen minutes for each tank. The stirring must be

\*Roasting of Gold and Silver Ores, by G. Kustel, for sale by Dewey & Co.

executed with vigor. Wooden grates fixed to a vertical stem will answer this purpose. Some use perforated wooden disks on the stem. After the last portion of the precipitant has been added and well stirred, the precipitated silver will soon settle; but it is well to allow one hour's time at least. The liquid must be clear. All the sulphide of calcium that was used, by giving up a part of its sulphur to the silver, is reduced to hyposulphite of lime, and in this way the amount of hyposulphite is constantly increasing; but on the other hand there is also some waste occurring at the end of the leaching. If the sulphide of calcium is made too weak, the hyposulphite of lime becomes diluted by degrees, and the lixivation would be imperfect.

The clear solution above the settled precipitates must be drawn off, either with a rubber syphon, to one end of which two short pieces of wood are fastened—as shown in the engraving, *c*—so as to prevent the hose from touching the bottom, in which case it would draw precipitated silver; or the clear solution can be removed also by a more convenient syphon, shown by *d*, which is made of a lead pipe. By lowering the same, the clear solution commences to flow through the outside end, as soon as it sinks below the level of the solution.

The solution from this precipitating vat runs through the gutter, *b*—shown in the engraving—into a large vat, from which it is pumped up into the solution vat, standing above leaching vats. The hyposulphite of lime is thus constantly circulating from the uppermost solution vat through the leaching vat into the precipitating tubs, and from thence into the lowest receiving vat, again to be pumped up into the solution vat. For this purpose wooden pumps answer very well.

### The Mechanics' Institute.

The report of the Fifteenth Industrial exhibition of the Mechanics' Institute has been published in pamphlet form. As we have before stated, the financial result was most satisfactory, and considering the time and circumstances, is a positive assurance that the Industrial fairs of the association are based upon a firm foundation, and that they supply the public with a place of resort where pleasure and profit can be obtained for a small outlay of money. The detail reports show that the gross receipts of the fair amount to \$41,106.05, the total expenses are \$27,271.33, leaving a net profit of \$13,834.72, which amount has been transferred to the treasury of the Institute. It is proper to add that the ordinary expenses of the fair were only \$22,981.42. The remaining sum of \$4,289.91 being for medals and cash premiums paid to exhibitors.

To the report of this fair is appended the report of P. B. Cornwall, the President, who shows the extent of the pecuniary benefit which the library has derived from the fair.

The books of the Institute show that the net profit derived from the first eight fairs, including sale of the buildings in which they were held, was \$88,860.30, and from the last seven fairs, all of which have been held in the building on Eighth street, the net profit paid to the Institute is \$72,674.18 cash, besides paying for the exhibition building and contents, now the property of the Institute, unincumbered, which building and fittings cost \$106,330.61, thus showing a net receipt of \$179,004.79 from the last seven fairs; and a grand total of \$267,865.09 as the result of the 15 fairs held under the auspices of this Institute.

The Board of Trustees have succeeded in obtaining from the owner of the ground a renewal of the lease for the lot occupied by the pavilion—the consideration is, payment of the taxes, which amount to \$4,760.78. The renewed lease will expire December 31, 1881.

Mr. Cornwall concludes: "Without discussing the broader aspects of industrial fairs, such as their educational and enlightening influence on the community at large, and their commercial benefit to the city and the State, it is sufficient for my present purpose to direct your attention to their continuance as necessary to the prosperity of the Institute, and to enable us to establish and maintain such lectures, classes and other means for technical education, as are properly within the province of such an institution as ours, and as will probably in the near future become its most distinctive features, when the place of a miscellaneous circulating library will be more completely filled by the free library, sustained by city taxes."

THE November bullion product of the mines at Leadville, Colorado, was upward of \$1,000,000, as follows:

Value of Silver.....	\$708,169
Value of Gold.....	963
Value of Lead.....	263,411
Value of Ore.....	68,200

Total for November.....	\$1,040,722
Total for October.....	1,339,200
Total for September.....	1,602,200

The yield for November was \$300,000 less than was expected. The camp will show a product of at least \$14,000,000 for the year, which is a very good exhibit. The question now is, will the camp do as well next year, or will the deposits gradually give out.

THE Hecla smelters, Montana, recently shipped 83,000 lbs. of bullion.



**NEW WORK IN OLD MINES.**—The Reno Gazette says: In 1852, A. W. Poole, the present United States Marshal of California, had a five-stamp mill on a claim at the mouth of Humboldt canyon, on the south side of American river, a few miles from Dutch Flat. The ore worked less than \$25 a ton, which was not considered an object in those days, and the works were allowed to go to ruin and rot away. This year the mine has been re-opened; a good trail has been built to Alta, five miles, and a bridge over the river at Buchre bar. The suspension wires are cables from one of the street railroads in San Francisco. A five-stamp mill was built last summer, and started up in July. There are from 4 to 5 ft. of ore. Hon. J. H. Neff, of Dutch Flat, has a patent for a claim higher up, called the Pioneer. A good deal of rich ore was taken out of it in early days, but it was not properly taken care of, and caved in. The old mill has rotted down, and the drifts have filled up. Some work is being done on it now, however, and the ledge was found the other day. It promises to be very rich. The drift mine, at Damascus, which has not been worked since 1852, is also looking up. The vein has been lost several times. It is now giving out very rich gravel.

**THE ELECTRICAL SPUR.**—As a supplement to the electrical hit, noticed some time ago, it may now be stated that Mr. G. Huttman, imperial quarry at Vienna, employs the electrical current in a very ingenious manner, in order to facilitate the management of the horse, especially for ladies. What next?

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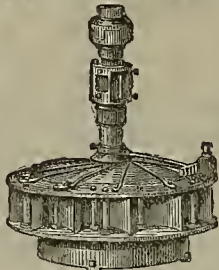
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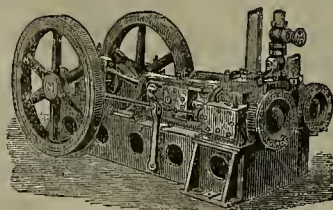
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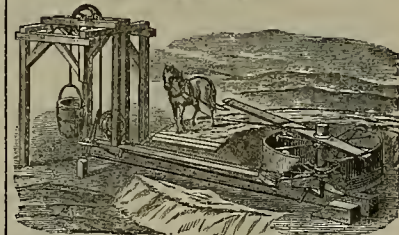
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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING DECEMBER 21st, 1880.  
235,730.—SOAP.—Henry J. Borie, S. F.  
235,622.—DITCHING MACHINE.—Thomas J. Chappelle and J. T. Ricketts, Gilroy, Cal.  
235,764.—FILTER.—T. Guinean, Sacramento, Cal.  
235,632.—SASH FASTENER.—Antone Haytt, S. F.  
235,816.—AIR COMPRESSOR.—E. A. Rix, S. F.  
NOTE.—Copies of U. S. and Foreign Patents furnished by DREW & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

AIR-COMPRESSOR.—E. A. Rix, San Francisco. Patented Dec. 21, 1880. No. 235,816. This invention relates to certain improvements in machines which are employed to compress air, and of that class in which the cylinders are provided at their compressing ends with a discharge-valve of the full area of the cylinder. It consists mainly, in the employment of a discharge-valve which occupies the entire area of the cylinder, and a means for regulating and adjusting the tension of this valve to make it close evenly all around and prevent chattering. In the construction of air-compressors various devices have been employed to allow the air to be entirely discharged at each stroke of the piston, and among others the employment of a single large valve which occupies the entire end of the cylinder, and which opens during the stroke of the piston and closes instantaneously when the piston commences its return stroke. This valve has hitherto been objectionable because it has not been possible to so regulate its tension in every case that it will not chatter and make a great noise when at work, and this difficulty has caused this class of compressors to be almost entirely abandoned. As it has been used in horizontal cylinders, dirt will unavoidably collect at the bottom of the cylinder, and will obstruct the seat on that side so that the valve will not close perfectly and will leak. The horizontal movement of the valve will also soon wear the lower side of the guide-opening so that the valve will not close truly. This invention consists in the combination with a valve of this construction, of a tension screw by which the valve may be actually adjusted and all chattering prevented.

FILTER.—Thos. Guinean, Sacramento, Cal. Patented December 21, 1880. No. 235,764. This filter is especially adapted to cleanse, purify and prepare muddy river and other soft water for culinary, drinking and other purposes. It consists of a vessel of suitable dimensions, having a partition which supports a filter. The filtering material is placed above and around this filter in such a manner that the water, after passing through the material, enters the chamber and from there flows into the receiver. From the top of the chamber two air pipes extend up to a point above the top of the filter, one being a little longer than the other, so that one supplies air to and the other discharges air from the chamber.

AN IMPROVEMENT.—The ore taken out at the Union Con. is being crushed at the stamp mill near the C. and C. shaft. Heretofore when brought in by the cars on the C. and C. side track it has been dumped on the platform on a level with the upper floor of the C. and C. works. It was then necessary to shovel it into cars and run it through the works in the mill. The handling of the ore with shovels was found to be expensive and slow. An excellent improvement has now been made. A track has been laid from the mill through on the lower floor of the works of the C. and C. and thence a tunnel run that passes under the C. and C. side track. In the side track has been placed a chute, into which the cars discharge, the ore being carried down to the tunnel in which is the car track leading to the mill. The bottom of the chute is provided with a gate for convenience in loading cars.—Virginia Enterprise.

SAYS the Homer, Mono county, Index: The surface of the country in Homer and adjacent districts is so favorable for deep workings by means of tunnels that we confidently expect to see many organizations for the purpose of exploring our mountains at a great depth.

THE Santa Fe New Mexican says that the San Pedro and Canyon del Agua company is employing a large force of men in all the branches of its mining work. The copper and gold mine is being developed by day and night shifts.

THE New York Hill mining company will pay its 10th dividend on the 3rd of January, of 20 cents per share, amounting to \$10,000.

Our State Government.

The following list comprises the representatives of the Executive, Judicial and Legislative departments of the State of California. It is worthy of preservation as a means of reference:

Executive Department.		
Governor.....	George C. Perkins	
Lieutenant Governor.....	Gen. John Mansfield	
Secretary of State.....	D. M. Burns	
Comptroller.....	D. M. Kenfield	
State Treasurer.....	John W. Sutter	
Attorney-General.....	John W. Sutter	
Superintendent of State Printing.....	J. W. Shanks	
Superintendent of Public Instruction.....	John D. Young	
Adjutant-General.....	F. M. Campbell	
State Librarian.....	Samuel W. Backus	
Railroad Commissioners.....	R. C. Graven	
George Stoneman.....	J. J. Beersbacher	
State Board of Equalization.....	James L. King, M. M.	
Drew, Warren Dutton, T. D. Haisell, D. M. Kenfield, Supreme Court Judges.....	E. F. Morrison, Chief Justice	
Associate Justices.....	E. W. McKinstry, J. D. Thornton, S. B. McKee, M. H. Myrick, D. M. Ross, J. R. Sharpston.	

Legislative Department.

NAME.	POSTOFFICE.	COUNTY.
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(First District—San Diego and San Bernardino.)		
J. W. Satterwhite (D.)		San Bernardino
(Second District—Los Angeles.)		
J. P. West (W. & N. C.)	Compton.	Los Angeles.
(Third District—Ventura.)		
Warren Chase (W.)	Santa Barbara.	Santa Barbara.
(Fourth District—Fresno.)		
Chester Rowell (R.)	Fresno.	Fresno.
(Fifth District—Mariposa; Merced and Stanislaus.)		
D. M. Pool (D.)	Hornitos.	Mariposa.
(Sixth District—Monterey, San Benito, and Santa Cruz.)		
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(Seventh District—Santa Clara.)		
George F. Baker (R.)	San Jose.	Santa Clara
J. C. Zuck (R.)	Gilroy.	
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(Ninth District—San Francisco.)		
C. C. Conger (W.)	1420 Broadway St.	San Francisco.
W. W. Traylor (R.)	2120	
(Tenth District—San Francisco.)		
Paul Newman (R.)	1718 Bush St.	San Francisco.
John H. Dickinson (R.)	2021 California St.	
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Thos. Kane (W.)	8 Zoe St. b. 3d & 4th.	San Francisco.
T. K. Nelson (W.)	545 Bryant St.	
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Joseph C. Gorman (W.)	5345 Natoma St.	San Francisco.
Martin Kelly (W.)	872 Mission St.	
(Thirteenth District—San Francisco.)		
John S. Enos (W.)	Chenery St., bet 30th & 31st.	S. F.
Theo. H. Hittell (R.)	803 Turk St.	San Francisco.
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E. H. Pardee (R.)		
(Fifteenth District—Contra Costa and Marin.)		
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(Sixteenth District—San Joaquin and Amador.)		
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A. T. Hudson (R.)	Stockton.	
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R. M. Lampson (R.)	Chinese Camp.	Tuolumne.
(Eighteenth District—Sacramento.)		
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William Johnston (R.)	Richland.	
(Nineteenth District—Solano and Yolo.)		
J. H. Harlan (N. C. & D.)	Woodland.	Yolo.
J. T. Wendell (R.)	Suisun.	Solano.
(Twentieth District—Napa, Lake and Sonoma.)		
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(Twenty-first District—Sonoma.)		
W. W. Moreland (D.)	Headbush.	Sonoma.
(Twenty-second District—Placer.)		
S. B. Burt (R.)	Bath.	Placer.
(Twenty-third District—El Dorado and Alpine.)		
W. H. Brown (R.)	Shingle Springs.	El Dorado.
(Twenty-fourth District—Napa and Sierra.)		
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William George (R.)	Grass Valley.	
(Twenty-fifth District—Yuba and Sutter.)		
E. A. Davis (R.)	Marysville.	Yuba.
(Twenty-sixth District—Butte, Plumas and Lassen.)		
W. A. Cheney (R.)	Quincy.	Plumas.
(Twenty-seventh District—Del Norte, Humboldt, and Modoc.)		
P. H. Ryan (W., N. C. & D.)	Eureka.	Humboldt.
(Twenty-eighth District—Siskiyou, Modoc, Trinity and Shasta.)		
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Valentin Alvino (R.)	Livermore.	Alameda.
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Leon D. Freer (D.)	Oroville.	Butte.
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J. B. Reddick (R.)	San Andreas.	Calaveras.
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J. F. Crank (R.)	Los Angeles.	Los Angeles.
H. F. Del Valle (D.)	Los Angeles.	Los Angeles.
H. J. Ormiston (D.)	Lakeport.	Lake.
J. W. East (D.)	Merced.	Mariposa & M'd.
C. L. Esley (R.)	Nicasio.	Mariu.
Wm. Holden (D.)	Ukiah.	Modocino.
Parris Kilburn (R.)	Salinas City.	Monterey.
Chancellor Harrison (R.)	San Jose.	Napa.
J. D. Long (R.)	Nevada City.	Nevada.
J. B. Patterson (R.)	Nevada City.	Nevada.
Thomas Mein (R.)	Grass Valley.	Nevada.
J. E. Hale (R.)	Auburn.	Placer.
W. W. Kellogg (D.)	Quincy.	Plumas & Las'n.

(Tenth, Twelfth, Eleventh, Twelfth and Thirteenth Districts.)

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Horace G. Platt (D.)	107 Jones	San Francisco.
T. J. Pindar (D.)	416 Broadway	San Francisco.
W. B. May (R.)	1114 Clay	San Francisco.
David McClure (R.)	Occidental H'v'l.	San Francisco.
J. C. Holt (R.)	97 Bush	San Francisco.
Oscar Lewis (R.)	2908 Sacram'to.	San Francisco.
Edward Keating (D.)	142 Second	San Francisco.
Dennis Geary (D.)	249 Fremont	San Francisco.
J. J. McCollum (D.)	63 Natoma	San Francisco.
J. G. Noonan (D.)	711 Howard	San Francisco.
M. Lane (D.)	1283 Market	San Francisco.
Jno. Burns (D.)	Brya't & Park av.	San Francisco.
W. J. Gavigan (D.)	633 Stephenson.	San Francisco.
J. C. Holt (R.)	1314 Scott	San Francisco.
J. W. McDonald (D.)	30 Dorland	San Francisco.
F. Garrity (D.)	221 London ave.	San Francisco.
H. J. Jackson (D.)	212 Oak	San Francisco.
J. N. Young (R.)	Sacramento.	Sacramento.

News in Brief.

EXTENSIVE floods are reported in Corunna, Spain.

THE Rev. Dr. Edwin H. Chapin died in New York Monday.

THE railroad tax of Placer county pays all the county's expenses.

PRESIDENT-ELECT ANDERWERT, of Switzerland, has committed suicide.

THERE is a great deal of smouldering discontent among the north Albanian chiefs.

CAMBRIDGE, Mass., on Tuesday, celebrated the 250th anniversary of its settlement.

RUSSIA has increased duties on imports 10%, and has raised the tax on all trade goods.

THE New York Board of Aldermen has resolved to grant no licenses to Chinese laundrymen.

TEN Ponca chiefs signed a paper, declaring they wished to remain on their land in Indian Territory.

IT is the opinion of competent judges that Russia has made ample concessions on the Chinese question.

AT Castle Garden, New York, up to Monday morning, 318,937 immigrants had landed since January 1, 1880.

THE recent storm on the Atlantic coast was the severest that had visited some of the sections for 50 years.

By a collision between two freight trains near Charlotte, N. C., on Sunday, four persons were killed and several wounded.

THROUGHOUT the Northwestern States the weather is intensely cold, the mercury ranging from 17° to 30° below zero.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolldio. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

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Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending this date, the Board of Directors of The German Savings and Loan Society has declared a dividend on Term Deposits at the rate of five and two-fifths (5 2/5) per cent. per annum, and on Ordinary Deposits at the rate of four and one-half (4 1/2) per cent. per annum, free from Federal Taxes, and payable on and after the fifteenth (15th) day of January, 1881. By order, GEORGE LITTLE, Sec'y. San Francisco, December 31, 1880.

DIVIDEND NOTICE.

San Francisco Savings Union,

532 California Street, corner Webb.  
For the half year ending with thirty-first (31st) December, 1880, a Dividend has been declared at the rate of five and two-fifths of one (5 2/5) per cent. (5 2/5) per annum on term deposits, and four and one-half (4 1/2) per cent. per annum on ordinary deposits, free of Federal tax, payable on and after Monday, seventeenth (17th) January, 1881.  
LOVELL WHITE, Cashier.

ANNUAL MEETING.

THE ANNUAL MEETING OF THE

Stockholders of the Silver King Mining Company.

Will be held at the office of the Company, Room 13, No. 323 Montgomery street, San Francisco, on Tuesday, January Eleventh (11th), 1881, at 12 o'clock, noon, for the election of a Board of Trustees to serve for the ensuing year, and for the transaction of such other business as may properly come before the meeting. Transfer books will close January Eighth (8th), 1881, at 12 o'clock, noon, and remain closed until after the meeting. San Francisco, December 29, 1880.

Alpha Hydraulic Gravel Mining Company.

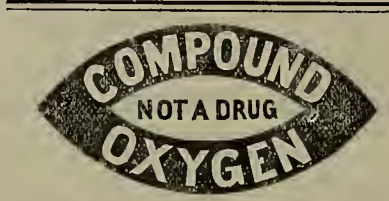
Location of principal place of business: San Francisco, Cal. Location of works: Alpha Hill, Nevada County, California.

Notice.—There are delinquent upon the following described Stock, on account of Assessment (No. 2) levied on the nineteenth (19th) day of November, 1880, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amt.
James Ireland, Trustee.....	10	1,000	\$200
John H. Hayes.....	14	200	40
William H. Hamilton.....	18	1,000	200
Alexander Girvin.....	19	650	110

And, in accordance with law, and an order of the Board of Directors, made on the nineteenth (19th) day of November, 1880, so many shares of each parcel of said Stock as may be necessary, will be sold at public auction at the office of said Company, No. 216 Sansome Street, San Francisco, Cal., on Monday the tenth (10th) day of January, 1881, at the hour of one (1) o'clock, P. M., of said day, to pay said delinquent Assessment thereon, together with costs of advertising and expenses of sale.

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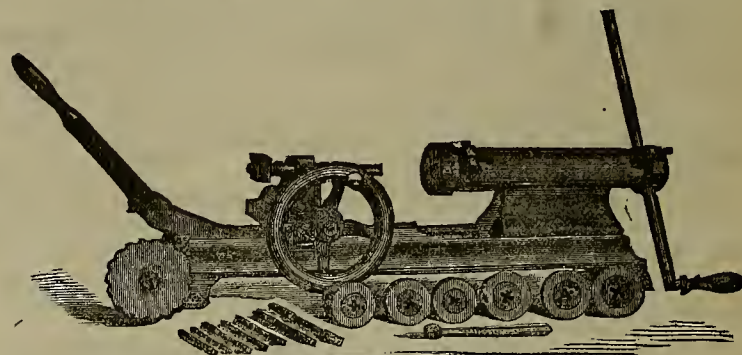
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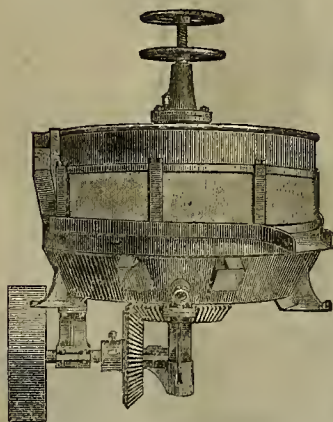
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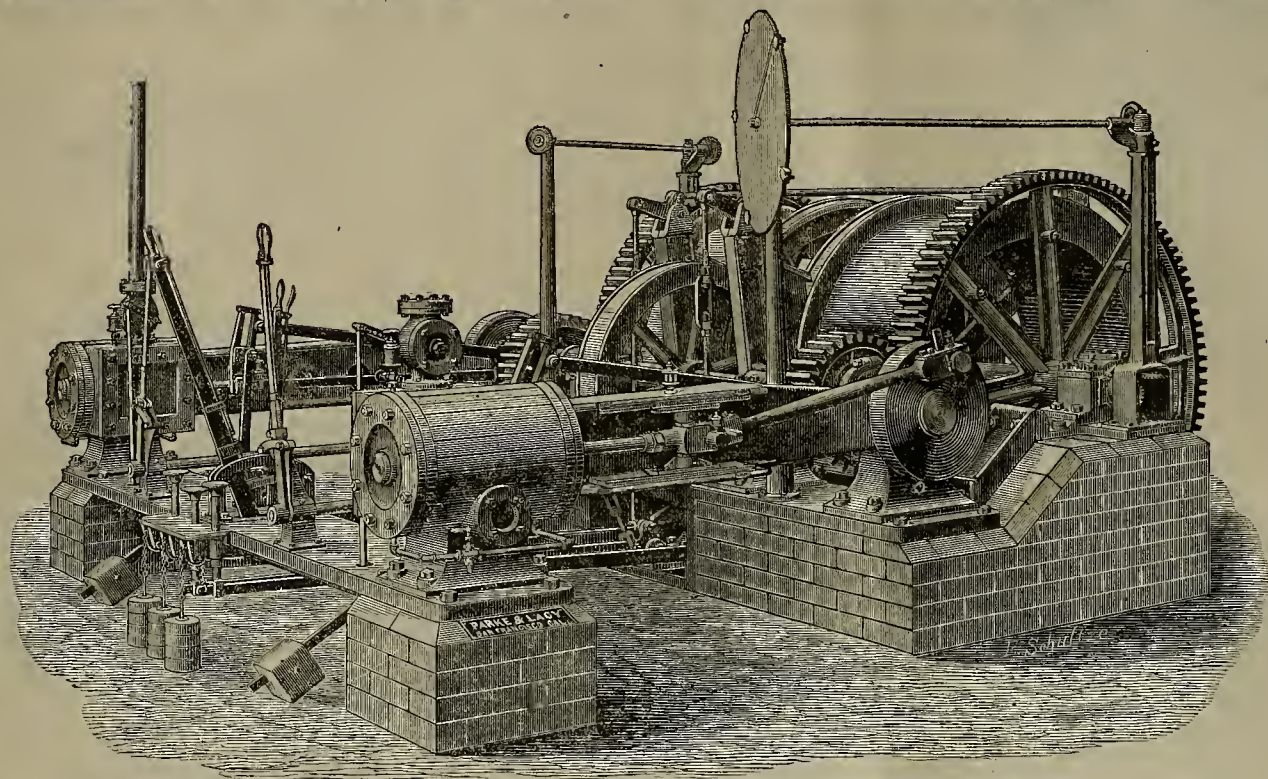
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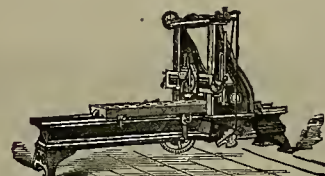
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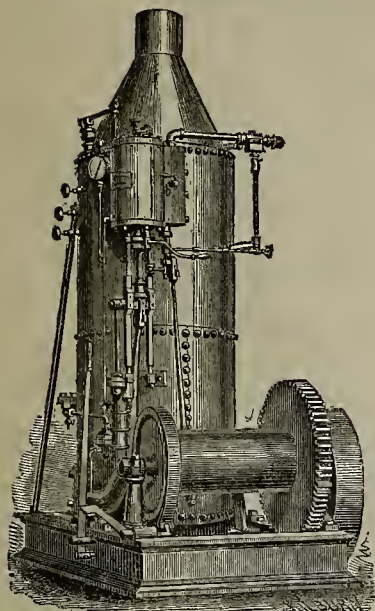
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PUTNAM'S ENGINE LATHE.

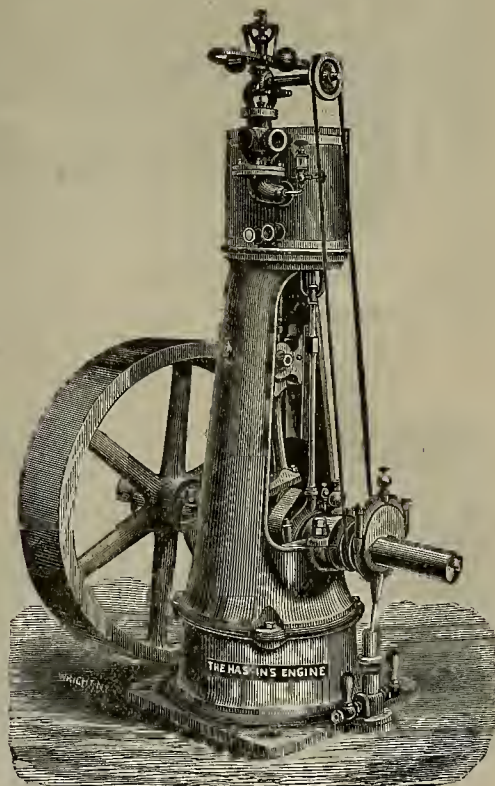
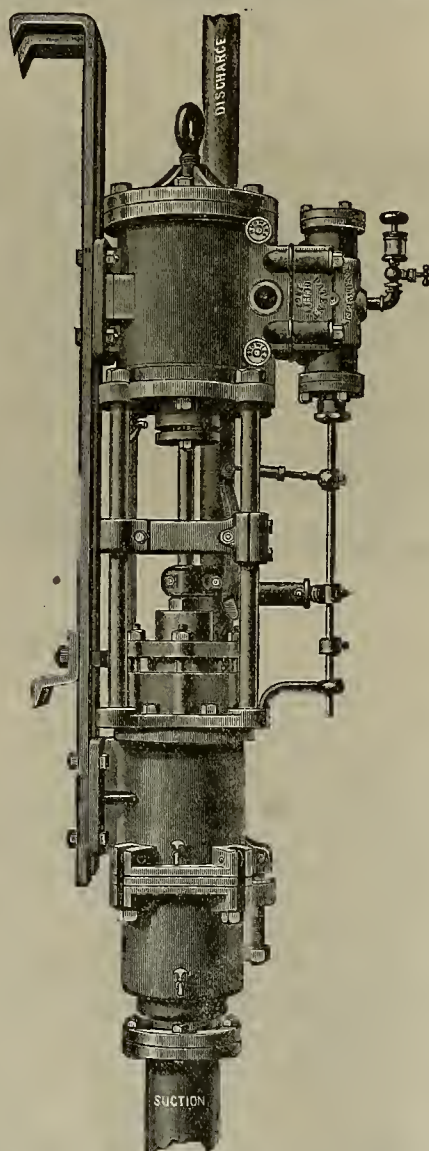


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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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## Welding.

There is a good deal more skill in welding properly than is generally supposed. The skillful blacksmith will weld quickly and neatly, while the clumsy one will do it slowly and in a slovenly manner. The same work is apparently done by each, but the results are by no means the same. In mining work particularly the lives of the men often depend on the work done by the blacksmith. Faulty or careless work on his part may lead to very disastrous results. A great deal depends on the way the work is done.

In speaking of welding a Southern blacksmith gives to the *Blacksmith and Wheelright* some examples of heavy welding, as for example jump welding long shafts, and scarf and swallow fork welds for the same. We repeat his remarks with the engravings accompanying them to illustrate his ideas. He says: In my opinion the jump weld is decidedly the best, if properly done, as it can be bent after welding to a right angle without showing any sign of the weld.

To make a jump weld properly the ends should be rounded, as shown in figure 1, and, after being brought to a welding heat with a good blast, drive them together with very light hammer blows, as a heavy blow would cause them to bounce. As the welding proceeds employ heavier blows and the weld will drive up as in figure 2, after which the weld may be forged and swaged down. This weld will bend to a right angle, as shown in figure 3, without showing the scarf, whereas a scarf weld, such as shown in figure 4, would show, when bent, its scarf as at A, in figure 5, while a swallow fork weld, such as is shown in figure 6, when bent will show its scarf, as in figure 7. Only the jump weld, you will see, will stand such bending and show a sound and complete weld.

## Legislative.

The Legislature convened at Sacramento on Monday, according to law, and the Governor's annual message was presented. We are unable to give the whole of this very full document, but shall take occasion hereafter to comment on its suggestions.

Mr. W. H. Parks, of Yuba Co., was elected Speaker of the House. Following officers were elected: McStay was elected Chief Clerk; Sergeant-at-Arms, Ezekiel Walker; Thos. Frazer, Speaker pro tem.; F. M. Pauley, Minute Clerk; J. H. Riley, Journal Clerk; Jacob Shans, Engraving Clerk; R. M. Apgar, Assistant Sergeant-at-Arms; D. H. Rand, Postmaster; Rev. Dr. Deal, Chaplain.

Wm. Johnson, President pro tem.; Secretary, Marcus D. Boruck; Assistant Secretaries, Jas. A. Orr, C. J. Johnson; Bart McNulty, Minute Clerk; J. R. Brierly, Journal Clerk; Edward C. Humphrey, Engraving Clerk; Mrs. Whittingham, Postmistress; Sergeant-at-Arms, Andrew Wasson; Assistant Sergeant-at-Arms, D. B. Kingery.

A number of bills have been introduced in both Houses. These we shall comment upon from time to time as occasion offers. They are too numerous to mention even by title in this issue.

It is certain that Gen. John F. Miller will be elected United States Senator.

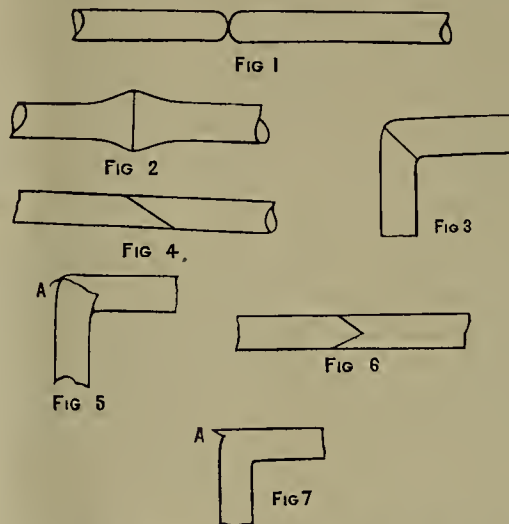
Says the Red River (N. M.) *Chronicle*: The discovery of valuable mines in our Territory has created quite a demand for donkeys, and few can be procured for less than \$15 per head. Even parties from Leadville, the San Juan region and other mining districts in Colorado, come now to New Mexico to buy burros. Two good packers can manage from 15 to 20 donkeys to bring ore down the side of the mountains, where it would take thousands of dollars to construct a wagon road.

The upper part of Montana is a very rich mining region, the mountains being full of iron, copper, lead, silver and gold, the latter being both in quartz and placer mines.

PROSPECTING for coal in the Santa Cruz mountains will commence this spring.

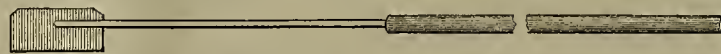
## Stirring Roasting Ores.

A short time since we illustrated from Mr. Guido Kustel's "Roasting of Gold and Silver Ores" (for sale by Dewey & Co.), a simple roasting furnace. At that time we omitted to mention the arrangement of the door, with regard to facilitating the stirring of the ore. As, however, the method described is applicable to any of those furnaces when the ore is stirred by hand, we give place to it now. It is simply a device to take the place of the usual iron roller in front of the working door. It is a wheel, which allows the hoe to be directed to the re-



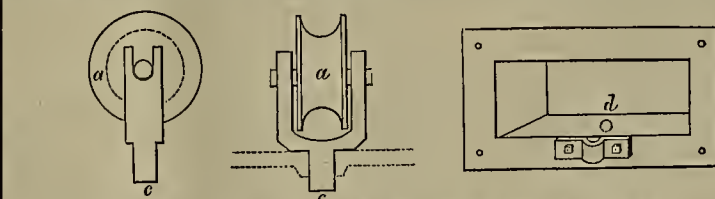
JUMP, SCARF, AND SWALLOW FORK WELDING.

quired points, which is not the case with the roller bars. The wheel, a, is about 2½ inches in diameter with ¾ inch journals, and has a grooved or hollowed face to receive the hoe handle. The



HOE FOR STIRRING ROASTING ORE.

pernal than that of the State Mineralogist. The act organizing the State Mining Bureau was one of the wisest measures passed at the last session. This, in part, is doubtless owing to its efficient management, for, although but



ROLLER FOR ORE ROASTING FURNACE DOORS.

the furnace, from the outside, by drilling two holes, and then screwing on a piece of bent iron of the shape shown. The hoe moves easily to and fro on the wheel, at the same time with the turn of the fork in any desired direction of the hearth. The engraving shows a grooved wheel one-quarter the size it should be made.

A hoe to be used with one of these furnaces is also shown in the engraving. It is of ½ inch wrought iron, six inches high and eight inches long, with a very long handle, it is preferable to use a piece of gas pipe, welding it to the rod handle as shown, so as to make it light.

WHITE PINE has shipped \$13,000,000 of bullion out of 28,000 recorded locations.

## The Executive and the Mines.

The Governor of the State of California is a good friend to the miner. He has been a miner himself, and now owns an interest in the famous Spring Valley hydraulic mine, we believe, and in some other mines as well. He took great interest in the organization of the State Mining Bureau, when it was formed, and still considers it a very important department, as the following paragraph from his message will show:

"Among the many reports presented for your consideration, I know none more deserving

them, and such other expenditure as may be rendered necessary for the practical benefit of the citizen.

"I have been informed that many very valuable and in some instances, exceedingly rare donations would be made to the Bureau were the same located in a building capable of showing them to advantage, and safe as a repository. To do this it will be necessary to change the present location, and as the value of the gifts would be greater than the outlay for rent, I deem it advisable such change should be made, and, in connection therewith, I would recommend that the mineral cabinet now bid away in our State library be transferred to the care of the Bureau, whose proper function it is to care for it."

It is probably just as well to bring that State library cabinet down here and put it in the general collection belonging to the State, and now increasing so fast as the Bureau. Mr. Hanks has not much room, however, where he is, his cases being all filled.

We hope also that a liberal fund will be allowed to fit out the Bureau with a complete and first-class mining and metallurgical library.

## Information About California Mines.

The Director General of the Mints of the United States has appointed Mr. W. A. Skidmore, a special agent of the Mint Bureau, to ascertain and report upon any facts connected with the sources of production of the precious metals in California. The appointment is a good one, as Mr. Skidmore is familiar with the various localities of the State from the experience gained by being for many years the California Deputy of the United States Mining Commissioner.

The Mint officials in this city have collected a large mass of statistics concerning the mines of this coast. A. M. Lawver who has charge of the details has brought intelligent energy to his work, and the results are entirely satisfactory. The work of Mr. Skidmore is to supplement the information already gathered. He is not to collect statistics, but information concerning the sources of production. He will describe the various large operations now going on in different parts of the State. He is to take cognizance of any new methods of mining, and new metallurgical processes or improved appliances for mining or milling.

In addition to the information being gathered in this way, the State Mining Bureau is busily engaged in collecting data of value to the mining public. It has already a large and valuable collection of ores, rocks and minerals. Maps of various localities have been gathered, and information of all kinds, which will be of use to the miners of the State, is being sought for from different sources. Mr. Hanks, the State Mineralogist, is busily engaged in preparing an elaborate report, in which he is aided by numerous assistants specially fitted to handle the special topics allotted to them. This report, when published, will no doubt be a most valuable addition to the literature of mining.

Besides this, the U. S. Geological Survey under Clarence King is doing a good deal of work in this State. They are collecting statistics of production, as well as information about mining and metallurgy which is general in its nature. That is, they will describe the processes in vogue for working the various kinds of ore, and describe the methods of working hydraulic, drift and quartz mines.

When all these reports are published, we shall have a large amount of information about mining and metallurgy, so that in future no mistakes can be made, and attributed to lack of sources for the acquirement of special knowledge.

THE New Jersey people want to buy up the smelting ore which Carson wants for her proposed smelter.

WATER was met at a depth of 750 ft. in the Eureka Con. Co's., new shaft.

BULLION and ore shipments from Colorado during 1880 amounted to \$22,500,000.



## Homer District.

## Development of the Leading Mine.

Public interest seems just now to justify a more thorough exposition and complete knowledge of operations in the Homer mining district, Mono county. Chief among them are those of the May Lundy mine and mill. The *Bodie Free Press* says: Owned by a private co-partnership, and conducted in a quiet and business-like manner, it is but natural that the owners have not considered it necessary that the public should understand the development and permanent resources of the mine. For the sake of the mining community, however, and the general interest in the Homer district, it has become important that the conduct of the May Lundy management should be better known. In view of these facts, we find ourselves enabled to set forth, from the best authority, the following statements: It is during the past three months that the

## Main Work of Development

Has been done. The owners have desired to conduct the mine entirely as a business enterprise, and have invested from time to time only such sums of money as was clearly apparent at each successive investment could be readily returned to them out of the mineral deposits in sight. Acting upon this plan, the operations have been conducted upon a comparative basis of sure returns. A tunnel of 311 ft. was first run through the solid granite before striking what has proved to be a main vein. August 25th last, upon striking this vein, a contract was let to Z. B. Ravenelle & Co., of Aurora and Bodie, for packing 1,200 tons of ore from the mine to a mill site, situated over five miles distant, upon Mill creek proper. It was thought by numerous parties that this amount of ore would never be extracted; nevertheless, 1,300 tons were packed down prior to Dec. 1st.

## A Main Drift

Has been run from the point of first striking the vein, as before mentioned, to a length of over 650 ft. from the tunnel mouth, or about a distance of 340 ft. upon the main vein. In this entire drift the vein has remained in a due course, a few degrees west of north, a width of between 18 inches and 6 ft., pitching 42° west, smooth walls, and assaying from \$35 to \$600 per ton. Stopes have been raised from the drift for a distance of less than 100 ft. in length, and, from the angle, to 60 ft. upward, and it is from this stope that the 1,300 tons have been mainly taken. Two hundred and fifty ft. of the drift has not been stoped at all, and from the level of the tunnel floor the top of the mountain is 500 ft. on the incline of the ledge. A winze has been sunk from the tunnel downward nearly 100 ft. From this it is clearly perceived that the May Lundy has

## Six Hundred ft. of Ore in Sight

For a distance of 400 ft. in length, including a short drift southward, not previously mentioned. If this amount of ore was all that the mine contains it is easy to calculate how far the owners have been justified in their operations and calculations. With a ledge 400 ft. in length, 600 ft. in height, averaging 30 inches in width and assaying an average assay of \$80 per ton, it is a good mine. With the strong surface indications of the ledge, running the whole length of the claim, 1,500 ft., and no reason to suppose that it does not go down, it appears there is scarcely a better prospect on the Pacific coast, and perhaps the word "mine" should be substituted for "prospect." Beside the main drift, there has been crosscuts of 20 and 40 ft. run eastward and westward, but not long enough now to cut the other veins which crop on the surface. At the mine have been built a substantial stone and lumber dining house, a lodging house to accommodate 80 men, a large blacksmith and tunnel house, a coal house, powder and store houses, and large stone platforms laid, on which to pile wood. The surface of the mine is broken and precipitous, and the buildings are perched in crevices. The trail from the mine to the mill is over four miles in length, and was built and repaired at great expense.

## The Mill

Has 5 stamps, 25 ft. of silver plates, blankets, clean-up pans, and the tailings are saved in a reservoir for future working. Of the 200 tons already worked, the yield has averaged \$65 per ton, and the proceeds considered incomplete. With better appliances undoubtedly more bullion would be produced. The mill is run either by an engine or a Leffel turbine wheel, and the machinery was made by Prescott, Scott & Co., of San Francisco. The May Lundy management will early next summer erect a 20 or 30-stamp mill close at the foot of the mine, run a lower tunnel and put up a tramway from it to the now mill, thus reducing expenses to a minimum. From the manager we learn that

## The Cost Per Ton

Of the ore on hand, including much dead work and "permanent improvements," has reached the high figure of \$42 per ton; but he is of the opinion, upon close calculation, that in another year the cost will be quickly reduced to \$15 per ton. He has amalgamated and shipped to the owners, notwithstanding discouraging delays and vexations, over \$12,000 in gold bullion of the finest quality, the last bar of \$3,000 being of a fineness of 797 gold and 217 silver; total, 984, and valued at \$16.13 per ounce. With such an exposition as this, it is apparent that Lundy is the "coming camp."

## Big Horn.

## The Country Next to be Heard From.

Not much is being said about the Big Horn valley, Wyoming, during all the excitements attending the discoveries of new El Dorados. The tide is turned toward New Mexico, Arizona, northwestern Texas and Old Mexico, and when the reaction comes, if it ever does, then the people will wake up to the fact that they have run by, skipped over and entirely forgotten that there is, in the northern part of Wyoming Territory, one of the richest valleys on the continent. It is of large area, and includes all the favorable points to be looked for by the farmer, the stock-raiser and the miner.

The distance, says the *Eureka Sentinel*, is only trifling for the eastern-bound traveler, from Southern Pass into the basin of the Big Horn, and as he moves down that stream, the climate and soil improve until the region where game has wintered, for 40 successive seasons, is reached. The old residents of the mountains and coast know what that means. It is good enough for them. Fruits of all the hardy kinds—apples, peaches, berries, etc., can be grown there, and the snow has never been known to lie upon the ground to exceed 24 hours. Groves are upon the banks of the river, and the basin sides are rich in gramma grass, which grows so luxuriant as to be easily cut with a mower.

The valley soil compares favorably, in depth of loam, with that of southern Minnesota.

About five years ago we saw an adventurous Montanian, Farley by name, striking for the Big Horn, with his little band of 60 stock cattle and household outfit complete. He took desperate chances, for the Sioux and Arapahoes were bad at that time. He located northeast of the Sweetwater mines somewhere about 75 miles, upon a spring claim, and has an unlimited supply for farming purposes and no one to interfere with his stock range. A letter from a gentleman at Green river, just received, says Farley has never been molested by the Indians, and has now a fine little farm, plenty of wild berry bushes (transplanted), 40 or 50 head of horses, and 570 head of cattle. He only lost one or two calves each spring, and that was during exceptionally hard storms. He has no stables or shelter; neither does he put up hay for his stock. They do not require it.

There are many settlers now in the valley, but the fear of Indian raids has kept back the rush of immigrants.

W. P. Clark, First Lieutenant Second Cavalry, has written to the adjutant general, United States army, department of Dakota, an elaborate report of a reconnaissance of the Big Horn mountains, made by a scouting and exploring party under his command, which started from Fort Keogh, Montana Territory, June 21, 1880. The trip was an extensive one, the party returning to Fort Custer on Sept. 3d. A general reconnaissance was made of the country to the southeast and northwest of the Big Horn range, the most prominent characteristics of the country soil, climate and streams seen by the exploring party being described at length. Most of the territory seen is already occupied by ranchers, and they are eagerly looking forward to the time when those portions now reserved to the Indians may be opened up to settlement. Between Tongue river and Shell creek several deserted silver mines were found, which had developed very good silver ore, but not sufficiently rich to pay the great expense of transportation, though the mines had been staked off by the first explorers, and are still held for whatever they may be worth. It has been expected that rich gold deposits would be discovered in the country west of the Big Horn range, and a party of Arapahoes were taken along to point out a spring near Norwood creek, where it was said an Indian woman had taken out some nuggets of gold. The noble red men did not care to give any exact information, or were unable to do so, and Lieut. Clark did not find the expected deposits. He states, however, that he is not prepared to assert that rich mines may not yet be found in the Big Horn mountains, and the favorable indications secured by the party are sufficient to justify a more careful search, especially near the headwaters of Painted Rock and Shell creeks, while further developments of the mines already discovered near the latter may give satisfactory results.

THE *Eureka Sentinel* of Dec. 24th contains the following in regard to the superintendency of the Eureka Consolidated mine: Hank Donnelly has resigned the superintendency of the Eureka Consolidated, and his resignation has been accepted. Thos. J. Read supersedes him, temporarily. The position has permanently been offered to J. A. Porter, formerly of the K K company. Mr. Porter has been telegraphed at Colorado regarding the position. His answer is expected in a few days. It is understood that his present employment with an Eastern company will not expire until March or April. The Eureka Consolidated Directory has informed him that they will hold the place open for him up to that time. If Mr. Porter accepts the superintendency of the Eureka Con. he will also be given charge of the Albion. These are facts, and from the most authentic sources.

TEMPERING STEEL.—Mr. Adamson, at a recent meeting of the British Iron and Steel Institute, at Dusseldorf, strongly condemned the practice of endeavoring to strengthen steel by tempering it in oil, because while that practice might increase the tensile strength, it impaired the elasticity and ductility of the metal.

## The White River Mines.

From a long article in the *Visalia Delta* on the White River mines, we make the following extract:

The notable characteristic of the mines is the great number of small gash veins of gold-bearing quartz which traverse the region. There are more small pieces of float quartz scattered over the country, showing free gold, than in any region we have ever seen. The leads from which this quartz came are generally from a few inches to a few feet in thickness. The formation in which these small veins occur is silicified granite, which generally carries a large percentage of horn-blende, which in some cases is so great as to give the rock the constituent properties of greenstone.

## The Country Rock is

Very much decomposed. Tunnels have traversed this rock 100 or 200 ft. without exploding a blast. The veins which out-cropped were mainly all discovered many years ago, and have been worked in many places five or ten ft. deep. In some places they have been worked 20 or 30 ft. deep, two or three have approximated 100 ft., and one shaft has reached 112 ft. The leads seem to have been worked until the wall-rocks became compact enough to resist the force of the pick, and then, in most cases, to have been abandoned. One lead has been traced for four miles and many thousands of dollars have been extracted from it. Another lead, having different names in different parts, runs into a small slate belt on the west of the district, and has been traced, most of the distance, for five miles. These leads belong to the Eclipse mill. The Grizzly lead has been opened and skimmed over for a distance of 2,000 ft.; yet we saw no work on it 30 ft. deep, though there is a fine lead in the bottom, covered with water. The leads run the unusual course of northeast and southwest, and in many cases are so flat as to partake of the character of "hanket ledges."

## Recent Explorations

Have shown that there is a class of ledges in the district which do not outcrop on the surface, Williams & Popple, by following a clay seam in the soft granite, some 30 ft., struck as fine a small vein as we have ever seen; gold shows in almost every lump of rock; and a lump of kaolin clay, in which the quartz is imbedded, the size of an egg, will yield a hundred colors by the simple process of washing. This lead averages about 20 inches deep, lies almost exactly flat, has more than 300 ft. of drift, which runs in pay rock which will probably yield more than \$100 per ton on the average. There are some of the sulphurets, however, which do not yield to the simple process of the arastra, and it is doubtful whether mere milling would save more than \$50 per ton. Cox & Hanson have struck a very similar lead a half mile lower down the hill. A clay seam was followed more than 110 ft. before this lead was struck. Keener, Jordan & Mahuron are having some fine-looking rock crushed at a small, rattle-trap of a mill near the town. The mill is so old that the frame work is tied to the adjacent willows to keep it from falling; the batteries are very light; it is a custom mill and is said to do the best work of any mill ever in the district. There are many springs in the district capable of supplying arastra, and in view of the size of the leads, the ores, when roasted, seem well suited to that mode of treatment.

## The Gulches.

White River, East Prong, Coarse Gold, Grizzly, Gordon and Rag gulches, are the principal streams which have yielded placer gold in the district. They have been worked for 27 years—having been discovered by Samuel Jennings, Henry Hartly and Nathan Dillon, all old residents of Tulare county. The lack of water has caused the placers to be worked in a very slovenly manner, and it is confidently believed that these gulches now contain more than half of their original supply of gold. Thorough search will reveal the fact that the main channel has been missed in many cases. In most cases the dirt has been drifted out and washed with a rocker. The flats are, in many cases, 20 ft. deep, with pay gravel only on the bedrock. In such a flat as this, on Gordon gulch, the hole was pointed out, in which Mr. A. A. Brown, now of Visalia, lost his leg by the caving of the bank. Notwithstanding

## The Lack of Water

And the general neglect, which these mines betray, several millions of dollars have been extracted from them since their discovery, and yet it is confidently believed that men acquainted with the business would go there and make from \$1 to \$3 per day by employing such facilities as are now at hand. Many small tributaries of the streams spoken of remain untouched. When the main stream is abandoned the fresher water could be turned into one of these small gulches and the whole worked out in a single winter. When such an enterprise has been undertaken it has generally paid well. The great trouble is men have been impatient in grasping for sudden wealth, and have laid idle while the dry placers only promise \$1½ per day.

We found business men ready to discourage innovation and who seemed to dread the chance of competition. Competition will come, however, and the White River mines will yield up their millions for the benefit of commerce.

In passing along the gulches we found several pieces of quartz gravel that had been

thrown from the rocker which showed gold on their surface. There are, doubtless, thousands of tons of rock of this kind, in the district, which will pay for working. Mr. Jack Malthy seems to have been one of the most successful miners of the district and the philosophy of this is that he has avoided idleness. He has worked in the placers in winter and in quartz in summer—availing himself of odd spells to improve one of the most beautiful ranches in that region. He and the partners who have worked with him have taken more than \$30,000 out of quartz—\$13,000 of which was Mr. Malthy's share.

In descending Rag gulch we find evidence of a former sojourn of the sea at a higher altitude over this valley than that indicated by any formation we have heretofore seen. The chalk hills which line the banks of the gulch from its junction with Gordon gulch down, rise 100 or 200 ft. above the level of the stream; and for a short distance the underlying granite is above the water, and is, in many cases, covered with a sheet of pay ground. Only about a mile in width of these placer hills is susceptible of exploration, however, without great outlay, as the bed rock dips rapidly below the bed of all the streams.

## Layers of Gold-Bearing Gravel

Intervene between different layers of this chalk, and under it, and, with plenty of water, would offer splendid chances for hydraulic mining. In a few cases drifts have been run into these deposits and the pay gravel obtained has been washed; but the miners have uniformly stopped when they conceived their drifts to have extended as far as the proper limits of the gulch. Only one miner in that region, so far as we could learn, seemed to suspect it an ocean deposit. This gentleman is a Frenchman named Constant Horda. Under the most discouraging circumstances he has persisted in running a tunnel under the chalk, 200 or 300 ft. away from the head of the gulch, and has been at length rewarded by striking a thin layer of gold-bearing gravel, with the bed rock pitching into the hill. The age of this formation will probably class with the Pliocene formation, or possibly it may class as old as the Miocene formations of the northern mines. We heard of no fossils being exhumed from these chalk hills; but immense quantities of the bones of the American mammoth.

## Harshaw Mines, Arizona.

We take the following from the *Arizona Citizen* of a recent date:

For some time past there has been but little direct news from Harshaw Camp, and more especially from Hermosa, and many stories have been put afloat, more or less biased, according to the wishes of the parties interested.

It may be remembered that reports were circulated that there was a scarcity of water, and that the Hermosa was running on half-tides. Since the day the mill first started it has never stopped except for necessary repairs to the machinery, and since a strike was made by some prospectors on a claim above the mill-site of a stream of water six inches in diameter, there has been enough water for three mills. The company have been making regular shipments of bullion from the start, and have averaged over \$125,000 a month, shipping in November \$140,000, and will probably run it up to \$160,000 for December.

Mr. Aikman informed a *Citizen* reporter that having heard parties say that ore was already being taken out from the works already done, he took occasion to inquire of the foreman of the mine as to the present state and workings, with the following result:

For the last eight weeks there has been 300 tons of ore at the mill, 400 tons at the mine in the ore house, and 200 tons in the mine broken and ready to run out as soon as the bins would allow space to store, thus keeping 900 tons of ore constantly ahead of the mill. The greater part of this ore is being taken from developments, and the mine is by no means being stopped.

In a shaft being run on top of the hill, near the office buildings, and known as shaft No. 5, at 90 ft. the ore was increasing in value, and contains large quantities of horn silver. In all the works ore is being found, and the indications are that the whole hill is a mass of mineral. The foreman laughed at the idea of the mine being "gouged," and said there was enough ore in sight to run two years at least.

The mill and mine are both under experienced foremen, well posted in all the branches of their business and who do their work in the most thorough manner. There are about 90 tons of ore run through in a day, which is worked to within 96% of the assays, giving bullion that averages 96 and 97 fine.

This is a pretty fair showing for a 20-stamp mill, and, as the foreman of the mine said, he would like to hear of any other mine in the Territory that keeps 900 tons of ore ahead of their mill.

TO REMOVE CLARET STAINS.—Spread a little salt over the stain at the table well fresh. If partly dry dampen with a little clean rain water, and when so done the washerwoman can rinse out the stain without difficulty by not using soap. I have succeeded in getting out claret stains of long standing by wetting and rubbing on the spot pulverized chalk and salt, and laying in the sun, repeating this many days, and keeping it damp.



## MECHANICAL PROGRESS.

## Mechanics as a Science.

Although no department of science—no portion of the advancement of civilization that takes us further from barbarism—is so marked in its triumphs and so certain in its beneficial results as that devoted to mechanics, it is a fact that it does not meet its proper approval or proper reward. It is really true that the mechanic is to-day paid much less for his labor, and very much less for his ideas and practical form, than others who merely reproduce and adapt the facts and settled opinions of their predecessors. The physician, the lawyer and the theologian charge and receive for their presentation of long ago acknowledged axioms, and even of new theories, handsome returns for their trouble. They are acknowledged necessities, while the mechanic is a sort of hanger-on to our civilization—a camp follower, with no recognized rank, and merely allowed place that he may prove his fitness. Certain perquisites follow the lawyer, the doctor of medicine and the theological instructor, all of which are lacking in the case of the mechanical engineer. It is unnecessary to refer to the chances of the lawyer for rich legal fees; to mention the opportunities of the physician with his rich and hypochondriac patients; and the recognition of the religious instructor, with his faculty of dealing with the doubtful, the troubled and the despairing. From these prolific sources these professors draw their incomes, and generally without question as to their individual fitness.

But the mechanical engineer, the adapter of theoretic science to practical utility, has no such resources, and even his legitimate income is limited and its amount frequently disputed. Yet he deals with facts and realities, and not with problematical hypothesis and impractical theories. When he gives an opinion or reports a diagnosis, his statements are based on unvarying laws, which are well understood by those of his profession who are competent. On his opinion vast enterprises, involving the labor of hundreds of men for years, and the expenditure of thousands of dollars, are readily undertaken by capitalists, and it is rare that they or the poorer stockholders find themselves wrong in depending on his acumen and scientific knowledge. In short, the professional opinions of the mechanical engineer are worth all that is paid for them, seldom misleading, rarely extravagant, generally reliable. Can as much be said with truth of the professional advice of others?

Men possessing these qualifications, and on whose opinions such vast enterprises rest, ought to be well paid. It costs much in time, labor and money for a lover of mechanics to become an expert—one whose opinion and direction may be accepted as absolutely reliable, and after the groundwork of theory has been prepared there is a long novitiate of practical service before the mechanical engineer can assume the position of director. It may be said, with entire truth, that in no profession are the exactions preparatory to profit so many and the time of apprenticeship so long.

The opinions of the lawyer are subject to revision and reversal by a higher authority; those of the theologian are contracted and disputed by a hundred different sects; those of the physician have other schools to deny their conclusions, and at best are but individual ideas, liable to be set at naught by another practitioner. But the opinions of the mechanical expert are based on known and proved facts, and are similar to those of every other competent expert. On such opinions the success or failure of vast industrial enterprises may be predicted, and on them are safely risked millions of money in untried experiments.

## Sand in Welding.

An intelligent correspondent of the *Blacksmith and Wheelwright* sums up the advantages and disadvantages of the use of sand in welding, as follows: All blacksmiths know that success in welding depends almost entirely upon having the "right heat." Now, in welding large iron, say two inches or more in diameter, the heat must be applied gradually, for otherwise the outside will burn before the center is ready to weld, and the same is true of small iron, though it is not so easily observed. It is just here that the sand comes into play. By coating the iron with sand the outside is protected, to some extent, from the heat, until the interior has reached the temperature for welding; and, more than that, the sand acts as a flux, and causes the iron to "flow" at a lower temperature than it otherwise would, the same as borax or any welding compound. Consequently, with sand, a welding heat can be obtained with somewhat less care and skill, and in a little shorter time after the iron is put into the fire.

On the other hand, besides the time lost in fussing with it, the sand is hammered into the iron, it leaves a rough pitted surface which cannot be smoothed up with the hammers, and if the forging is to be finished, either by a file or machine, the presence of the sand will be made evident.

On the whole, I think that by exercising a little care in heating the iron, stronger, better finished, and much more work can be done without the use of sand or any substitute for it, than can ever be done with it.

## Danger from Emery Wheels.

As a rule, when an emery wheel bursts, the person to blame is killed in his tracks, and the maker of the wheel is censured, while it would be about as reasonable to blame the maker of a steam boiler because it blew up from low water, or a tied down safety valve, as no precautions or tests on the part of the maker can avoid accidents. As a rule, when emery wheels burst, they are not running at one-third the speed at which they were tested before they left the maker. What, then, is the reason that such wheels burst after being in use for months, and often when not running over half as fast as they were run when first put into use?

Speed alone does not cause a wheel to fly to pieces. Want of judgment, as a rule, is the whole trouble. If employers of workmen and buyers of emery wheels would purchase wheels that would cut, not grind their work, and would be content to see a wheel wear out in proportion to its cutting qualities, and would realize that time, as well as emery wheels, costs money, one cause of danger would be removed. If, also, they would so belt a wheel that in case it was crowded, the belt would slip, another cause of danger would be removed. Then, if the men who used wheels would be as careful after using a wheel a month as they were the first day, and would realize that an emery wheel can only hurt once, and that may be any time, it would be far better.

The first or original emery wheel is much to blame for all accidents. It was composed of emery and cementing material that had no cutting qualities. If it was not run fast enough to generate frictional heat enough to burn away the non-cutting cementing matter, it glazed, and all other wheels are judged by the standard that the first emery wheels seemed to set up.

I hold, as a rule, any emery wheel that will not cut like a file or a diamond—i. e., by contact—is not a good or safe wheel to use. If it will not cut unless it is run at a dangerous speed, it is not safe. When an emery wheel requires to be run at a certain speed and the work to be forced up to it, and gives off a smell of any kind when in use, it is dangerous.

If buyers of wheels would be content to see them wear away, and would buy wheels that did not require the work to be forced against them, then users of wheels would become lighter-handed, and accidents would be less frequent. Not one free cutting soft wheel in a thousand, run at a reasonable speed, comes to grief—all the accidents, as a rule, taking place with hard, tough wheels, that become untrue in use, when, in addition to centrifugal force, the body in motion is out of balance. The strain upon it will be more or less great, and will be of a character that is not and cannot be foreseen or guarded against except by the man using it. Another cause of accidents is too sudden and too rough an application of the work, as when a casting is brought against a revolving wheel so as to check, or tend to check the motion. This occasions more accidents than all other causes, and might be greatly relieved by using belts of less width and obliging the user of a wheel to be less rough.—*Iron Age*.

## Hints on How to Use a File.

Use new files on broad surfaces, and apply them to narrower ones as they get duller. This will save the files from tooth-breaking and rapid wear.

Use the edge of the file to remove scale or hard spots.

Stand well off the work for heavy filing, and let the body, as well as the arms, have motion.

Place as much weight as possible on the file (for rough filing) on the forward stroke, and use as near as possible the full length of the file.

Keep the file clean and clear of pins or cuttings in the teeth.

Vary the direction of the file marks, making them cross each other diagonally at every 10 or a dozen strokes.

For smooth filing do not exert too heavy a pressure, as it causes the file to pin.

Do not draw file until all the rough cross-filing is smoothly filed out.

Let the file make cross and recross about every dozen strokes.

Never oil a file, but chalk it, and, with the hand, occasionally brush off the old chalk and cuttings with a file-card, and apply fresh chalk.

Remove pins from the file teeth as soon as they are discovered. Pins are less liable to occur when filing across the grain than when filing lengthwise of it.

Pins form more readily with long strokes than with short ones, and with straight file marks than with diagonally crossing ones; hence a slight lateral motion should accompany every stroke. This applies even in draw-filing, except, of course, for the very last finishing strokes.—*Blacksmith and Wheelwright*.

THE GREAT CRANE AT WOOLWICH.—The largest crane in the world is nearing completion at the Woolwich Arsenal. Two thousand tons of iron are employed in its construction, and it covers a quarter of an acre. Four years have been occupied in putting the monster machine together. When finished it is expected that it will be able to lift four 100-ton guns, and one man can easily work it.

## SCIENTIFIC PROGRESS.

## An Artificial Eye Sensitive to Light.

In the course of a discussion on a paper recently read before an English scientific body by Prof. Bell, Dr. C. W. Siemens was called upon to describe and explain one of his recent inventions, which he terms a "selenium eye." The substance of his remarks is given as follows: The researches made by Dr. Werner Siemens on the cause of the extraordinary variations in the resistance of selenium to the passage of an electric current caused by light, led to the conclusion that the resistance of selenium, and probably, indeed, of all substances, varied inversely to the amount of heat which they contained; and the reason why selenium showed such extraordinary changes under the influence of light was, that under the influence it changed from one aggregate condition to another—from an amorphous to a crystalline condition; and that at the moment when this change took place a great deal of heat was absorbed, and, therefore, the specific heat of the selenium was very much increased. Dr. Siemens has constructed a little instrument to show the effect of these changes. It has the form of an eye, and on opening the lids a lens is presented to the light; through that lens the light falling upon it is concentrated upon a spot in the interior of the ball. At that spot a selenium grating is placed, consisting of five wires laid in zigzag fashion; one wire is connected to the positive, and the other to the negative pole of a battery, with a galvanometer in the circuit. These wires, lying close together, but not touching, are laid on a plate of mica; a drop of selenium is placed upon them, and this small quantity suffices to produce the desired results. The principal object Dr. Siemens had in devising it was to construct a selenium photometer; but a difficulty arose in using it for that purpose, because selenium got fatigued under the influence of light. The "eye" after being exposed for any considerable period to an intense light becomes insensitive, and the lids have to be closed; it has to go to sleep for some time before it regains its sensitiveness, and the analogy to the human eye goes even further than that. If the eye is used after having been kept in the dark for a length of time it detects the slightest gleam of light, and marks it on the galvanometer, whereas after it has been once used in intenser lights, a small gleam is utterly lost upon it, until it has again had ample rest. Dr. Siemens showed some experiments with variously colored sheets of cardboard prepared for the purpose, and the reflected light was found to cause a deflection of the galvanometer in each case, the slightest effect being produced with light reflected from a black piece of paper, and successively increasing with green, red and white, the greatest of all being produced by exposing it to the direct light of an argand burner.

## Molecular Physics.

This may be truly called the age of progress. A day in this realm of science is as a thousand years of the ancients. Day by day, new facts are being developed, which, in the hands of physicists, are instrumental in unraveling the mysteries of nature.

Physical science teaches us that matter is not continuous; it may be divided. The end of physical division is the molecule. The molecule may be divided by chemical means; the end of chemical division is the atom. Atoms *per se* are inert; their energy is derived from the imponderable physical agents, i. e., attraction and caloric. Attraction is inherent in the atoms; it can neither be increased nor diminished. It tends to draw the elements together and hold them there in a state of rest. Caloric accompanies the elements, and can be increased or diminished; it tends to separate the elements and push them outward into a state of activity.

By virtue of these two imponderable physical agents, the atoms unite in relative equivalents and form molecules, and the molecules unite and form a physical structure, in which neither the atoms in a molecule, nor the molecules in a physical structure are in an absolute state of rest, nor in absolute impact at any time, they being held at a relative distance from each other by virtue of the resultant force exerted by the imponderable physical agents, and are kept in constant activity by virtue of a reduction or augmentation of the resultant force caused by an increase or decrease of caloric in it.

Now, applying these facts in molecular physics to metallurgy we find that when iron or steel is ruptured, it is not the iron *per se* which is broken, but it is a rupture of the molecular resultant force; hence the imponderable physical agents are the prime factors, and the absolute measure of the strength of iron and steel, and progress in metallurgy means progress in molecular physics.—*Cincinnati Artisan*.

THE DIAPHOTE.—Prof. Perosino, at Mondovi, and Dr. H. E. Licht, of Bethlehem, according to *Les Mondes*, have both experimented upon Edison's principle of transmission by telegraphic wires of the forms and colors of objects in the same way as sounds are transmitted by the telephone. They hope to be able to contrive an apparatus by which two persons who are separated by an ocean will be able to see and hear each other.

## Mechanical and Scientific Progress.

It is an interesting feature of our times to note the rapid progress which has been made in manufacturing ingenuity and scientific skill in the production of substitutes for expensive or scarce raw materials and articles in general demand. It cannot be controverted that art is fast invading the domain of nature. Chemistry is enabling us to replace animal and vegetable dyes, and to form artificial gems or creditable imitations of them, which, as ornaments, answer every purpose. Mineral oils replace animal and vegetable ones for illuminating purposes, and the electric light is slowly superseding the use of noxious and costly gas. The sea tortoise no longer lures the adventurous sailors, nor are the ostriches of the desert hunted for the sacrifice of health and often of life itself. These genuine products have been so long in universal use as to become necessities of our civilization unless very similar articles can be ingeniously substituted for them.

Chemistry and science have enabled us to manufacture our own tortoise shell, ivory, and feathers, without the risk of visiting wild jungles and arctic or tropic seas for our supplies. A half dozen available substitutes for whalebone are manufactured. Ivory, so extensively in use, is superseded by celluloid. Piano and organ keys, billiard balls, hand mirrors, and handles of knives and forks, are nearly all made of this ingenious chemical substitute for ivory. In the imitation of tortoise shell, it is made into combs, card cases, napkin rings, and the like; while the pink coral, so popular with jewelers and ladies, is imitated by it to perfection.

Ostrich feathers, even the court plumes of fashion, and held formerly at prices which only admitted of their use by the wealthy few, are eclipsed in beauty and durability by the ingenious hand of skilled manufacture. A compound of silk or celluloid, spun glass, and other materials is now so cunningly combined as to be equally desirable with the genuine ostrich feathers, and a very close examination is required to detect the original from the substitute. Artificial stone and marble are made to any extent, actually rivaling the originals in strength, beauty and durability. Artificial alizarine is now substituted for the natural product of madder. It is not much more than one-third the cost of madder as originally supplied from the dye-root. We might find plenty of other similar examples to impress the fact of our subject, namely, the rapid mechanical and chemical progress of the times.

SPONTANEOUS IGNITION.—Attention has recently been called to some peculiar cases of spontaneous ignition of hydrogen in air, the phenomenon having been noticed, it seems, in factories where quantities of zinc were being dissolved in hydrochloric acid for the preparation of zinc chloride. Violent explosions took place when no flame was near, and it was eventually ascertained that the gas took fire spontaneously. It is thought to be caused by fragments of very porous zinc, which, when lifted above the surface of the liquid, during the violent evolution of the gas, and so brought into contact with hydrogen and air, act just as spongy platinum would do under the circumstances. The performance of such operations in the open air is recommended. The ignition can be shown, according to M. Hoffman, by treating a few kilogrammes of finely divided zinc with acid; the zinc dust, he says, may even ignite by contact with water.

THE SENSE OF COLORS.—At the recent meeting of the French Association for the advancement of science, M. Charpentier, of Nancy, read a paper, in which he propounded the somewhat novel theory that the sense of light and that of colors are independent. Since white light is the sum total of the various colors, it has been commonly thought that the sensation of white light was simply the sum total of the sensations of its constituent colors. On the ground that the sensitiveness of the eye for white light may be increased—as, for instance, by the previous absence of all light—without the sensitiveness for color being increased, he urges that there is a color sense as distinct from that of light as is the sense of touch from the sense of heat.

THE FORMATION OF MOUNTAINS.—Speaking of the formation of mountains, Prof. Favre, of Geneva, has said that the three systems which account for the origin of mountains do not differ greatly from each other. Those who admit the system of elevations as the principal cause would probably admit the formation of depressions as a secondary cause, while those who give depression the first place, would also admit elevation as a secondary factor. Lastly, in the system of lateral crushing there is a general depression of the earth, since there is a diminution in the length of the radius of the globe, and yet there result elevations of the ground in the midst of this general depression.

CHINESE ASTRONOMY.—In the largest library in the world, in Paris, may be found a Chinese chart of the heavens, made about 600 years before Christ. In this chart 1,460 stars are found to be correctly inserted, as corroborated by the scientists of the present day.

A NEW BATTERY is being produced, having one of its elements composed of sheet iron less than the ten-thousandth of an inch in thickness.



## MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

Name of Company.	Week Ending Dec. 16.	Week Ending Dec. 23.	Week Ending Dec. 30.	Week Ending Jan. 6.
Alpha.....	4	3	4	21
Alta.....	6	3.45	4.85	2.93
Andes.....	2.40	1	1.80	1.63
Alps.....	.....	.....	.....	1.90
Arizona.....	.....	.....	.....	1.60
Atlantic.....	45c	.....	5c	.....
Aurora Tunnel.....	.....	.....	.....	.....
Baltimore Con.....	.....	2	21	1.90
Bell.....	.....	.....	1.30	1.10
Belmont.....	15c	.....	.....	.....
Best & Belcher.....	84	89	94	81
Bullion.....	1.80	1.90	1.90	1.80
Bedford.....	.....	.....	.....	.....
Bodie.....	35c	.....	.....	.....
Bodie.....	63	63	63	61
Benton.....	2.35	1.40	1.45	90c
Bowler.....	1.15	.....	.....	.....
Black Hawk.....	.....	.....	.....	.....
Belvidere.....	10c	5c	10c	.....
Booker.....	5c	.....	.....	.....
Boston.....	5c	15c	15c	10c
California.....	1.70	1.3	1.60	1.55
Challenge.....	70c	.....	.....	.....
Chollar.....	2.55	2.20	2.80	2.40
Confidence.....	.....	.....	.....	.....
Concord.....	25c	20c	20c	15c
Con Virginia.....	2.20	2.10	2.20	2.10
Crown Point.....	12	1.03	1.20	1
Con Wasboe.....	.....	.....	.....	.....
Champion.....	.....	.....	.....	.....
Condit.....	.....	.....	.....	.....
Dayton.....	.....	.....	.....	.....
DeFrees.....	.....	.....	.....	.....
Daney.....	.....	.....	.....	.....
Durham Con.....	19	19	18	19
Escherquer.....	1.40	1.15	1	1.10
Endowment.....	.....	.....	.....	.....
Genoa.....	.....	.....	.....	.....
Golden Prize.....	1.45	1.40	1.30	1
Gila.....	.....	.....	.....	.....
Golden Chariot.....	.....	.....	.....	.....
Golden Terra.....	.....	.....	.....	.....
Goldfield.....	.....	.....	.....	.....
Gould & Curry.....	3.95	3	4	3.55
Hale & Norcross.....	5.4	4.05	7	4.90
Hillside.....	.....	.....	.....	.....
Highbridge.....	.....	.....	.....	.....
Holmes.....	.....	.....	.....	.....
Hussey.....	.....	.....	.....	.....
Independence.....	40c	.....	40c	.....
Julia.....	45c	25c	30c	.....
Kearney.....	2.70	1	1.70	80c
Jackson.....	.....	.....	.....	.....
Joe Seates.....	.....	.....	.....	.....
K K Con.....	.....	.....	.....	.....
Kentuck.....	12	1.20	1.20	.....
Kossuth.....	.....	.....	.....	.....
Keystone.....	.....	.....	.....	.....
Lady Bryan.....	.....	.....	.....	.....
Lady Wash.....	40c	20c	25c	20c
Leopard.....	.....	.....	.....	.....
Levathan.....	.....	.....	.....	.....
Leeds.....	5c	.....	.....	.....
Lee.....	.....	.....	.....	.....
May Belle.....	.....	.....	.....	.....
Manhattan.....	.....	.....	.....	.....
Martin White.....	.....	.....	.....	.....
McClinton.....	.....	.....	.....	.....
Meadow Valley.....	.....	.....	.....	.....
Mexican.....	71	63	81	63
Mides.....	.....	.....	.....	.....
Morning Star.....	.....	.....	.....	.....
North Con Virginia.....	.....	.....	.....	.....
Northern Belle.....	.....	.....	.....	.....
New Coso.....	.....	.....	.....	.....
Navajo.....	85c	60c	80c	35c
Ocidental.....	11	12	1.20	1
Oregon.....	60	63	73	63
Oriental.....	.....	.....	.....	.....
Overman.....	60c	55c	65c	60c
Panther.....	.....	.....	.....	.....
Phoebe.....	.....	.....	.....	.....
Phil Sheridan.....	.....	.....	.....	.....
Potosi.....	1.90	1	2	1.35
Prospect.....	.....	.....	.....	.....
Raymond & Ely.....	.....	.....	.....	.....
Richer.....	.....	.....	.....	.....
Rock Island.....	.....	.....	.....	.....
Rye Patch.....	.....	.....	.....	.....
Rough & Ready.....	.....	.....	.....	.....
Savage.....	2.70	1.30	2	2
Sierra Nevada.....	.....	.....	.....	.....
Silver Hill.....	40c	20c	50c	35c
Silver King.....	14	13	14	13
Suitor.....	.....	.....	.....	.....
Summit.....	25c	.....	.....	.....
Scorpion.....	11	1.30	1.35	1.10
San Silve.....	.....	.....	.....	.....
South Bodie.....	.....	.....	.....	.....
South Standard.....	.....	.....	.....	.....
Star.....	.....	.....	.....	.....
St. Louis.....	.....	.....	.....	.....
Stoga Con.....	50c	.....	.....	.....
Tioga Con.....	.....	.....	.....	.....
Tiptop.....	2.80	2	2	2
Trojan.....	.....	.....	.....	.....
Utah Con.....	10c	10c	11c	12c
Vermont Con.....	94	8	8	94
Ward.....	11	.....	.....	.....
Wells-Fargo.....	15c	10c	5c	.....
White Cloud.....	.....	.....	.....	.....
Yellow Jacket.....	.....	.....	.....	.....

<b>Wed'sday</b>	<b>M., Jan. 30.</b>	<b>1930 Wells Fargo.....</b>	
500 Alta.....	1.35@1.30	275 Yellow Jacket...2#@2.40	
230 Andes.....	1.40@1.45		
83 Belcher.....	1.10@1.05	<b>AFTERNOON SESSION.</b>	
31 Bullion.....	.12	500 Altas.....	2c
100 Chamberlain.....	.14	200 Elkhorn.....	50c
35 Pcenton.....	.80@65c	230 Boston.....	50c
165 California.....	1.45@1.30	400 Black Hawk.....	100c
20 Con Virginia.....	1.90	100 Bodie.....	50c
350 Collar.....	1.90@2c	50 Bechtel.....	80c
47 Crater.....	1.10	100 Blair.....	50c
100 Caledonia.....	.25c	750 Champion.....	50c
100 Con Imperial.....	.15c	80 Columbus.....	25c
50 Combedore.....	2.20	100 Day.....	15c
50 Essequen.....	1.10@1.10	50 Standard.....	100c
250 Gonic Chief.....	80c	100 Eagle Eye.....	50c
35 Hale & Nor.....	1.85@1.45	105 Grand Prize.....	1.65c
100 Julia.....	.15c	250 Goodshaw.....	8c
100 Justice.....	.45c	300 Modoc.....	1.90@1c
500 Wash.....	.06c	200 Nootan.....	50c
230 Mexican.....	.80c	400 Oregon.....	30c
300 Ophir.....	.68	100 N Belle Is.....	100c
12 Overman.....	.80c	50 Northern Belle.....	50c
100 Orig Gold Hill.....	.20c	300 Navajo.....	50@28c
500 Fortuna.....	1.90c	400 Org.....	30c
240 Savage.....	1.60	100 Silver King.....	100c
35 Sierra Nevada.....	.80@8c	100 Star.....	100c
200 Silver Hill.....	.35c	100 Syndicate.....	30c
300 South.....	.14	100 Tazewell.....	30c
250 Union.....	.10c	100 University.....	100c
200 Utah.....	.80@8c	100 Wales.....	8c
150 Ward.....	.12		

SAYS the Virginia (Nev.) *Chronicle*: Silver City looks dull and desolate. One after another the Bacon, Devil's Gate, Pioneer and Hope mills have been torn down and used for firewood.

THE Eureka tunnel has been run under the mountain 1,000 ft. in two years.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

### ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Bullion M Co	Nevada	17	50	Dec 14	Jan 17	Feb 7	J M Brazell	328 Montgomery st
Belcher M Co	Nevada	17	10	Jan 24	Feb 21	Feb 21	W P Hew	310 Pine st
Belvidere M Co	Cal	9	50	Dec 7	Jan 10	Jan 23	O W Hubbard	310 Pine st
Bechtel M Co	Cal	7	15	Dec 3	Jan 10	Jan 31	W H Lent	309 Montgomery st
Bullion M Co	Nevada	17	50	Dec 14	Jan 17	Feb 7	J M Brazell	328 Montgomery st
Bear River M Co	Nev	33	35	Jan 23	Feb 25	Feb 25	R W Lewis	414 California st
Golden Fleece M Co	California	19	30 00	Dec 19	Jan 22	Feb 12	F Sherman	785 Folsom st
Crown Point M Co	Nevada	44	50	Dec 23	Feb 2	Feb 23	J Newman	327 Pine st
Easterington Deep Gravel M Co	Cal	14	25	Dec 23	Jan 23	Feb 14	D B Chablain	327 Pine st
Hale & Norcross M Co	California	9	25	Dec 2	Feb 2	Mar 2	O C Davis	327 Pine st
Hale & Norcross M Co	Nevada	67	75	Dec 8	Jan 13	Feb 7	J F Lightner	9 Montgomery st
Head Center M Co	Arizona	11	30	Dec 21	Jan 21	Feb 23	J W Pew	310 Pine st
Leeds M Co	Utah	3	15	Nov 16	Dec 27	Jan 23	D B Chisholm	327 Pine st
Lulla M Co	California	14	20	Jan 14	Feb 10	Feb 10	H L Charles	410 California st
Lulla Con M Co	Nevada	14	30	Dec 15	Jan 20	Feb 14	H L Charles	419 California st
Jackson M Co	Nevada	13	20	Nov 23	Dec 27	Jan 17	C M Shaw	408 California st
Mackey M Co	Nevada	5	26	Nov 23	Dec 30	Jan 24	J M Fumington	309 Montgomery st
Monroe M Co	California	10	30	Dec 23	Feb 23	Feb 23	G D Edwards	369 Montgomery st
Overman M Co	Nevada	48	50	Dec 6	Jan 6	Jan 27	G D Edwards	414 California st
Potosi M Co	Nevada	5	50	Dec 10	Jan 14	Feb 5	W E Dean	309 Montgomery st
Spaulding M Co	California	1	10	Dec 17	Feb 15	Mc 15	J Hein	117 Battery st
Merr Nevada M Co	Nevada	1	10	Nov 11	Jan 15	Feb 15	L E Lark	309 Montgomery st
Therium M Co	California	24	10	Dec 1	Jan 1	Feb 23	J M Litchfield	425 Montgomery st
Gold Hill M Co	Nev	9	10	Nov 23	Jan 5	Jan 24	J M Buffington	309 California st
Thoga M Co	Cal	12	15	Nov 30	Jan 4	Jan 24	W H Lent	309 Montgomery st
Union Extension M Co	Nevada	1	10	Nov 26	Dec 27	Jan 20	R Messary	120 Battery st
Yellow Jacket M Co	Nevada	40	1 00	Jan 10	Feb 10	Mar 18	M Oles	Gold Hill

### OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

Argenta M Co	Nevada	6	10	Nov	20	Dec	22	Jan	12	E M Hall	327 Pine st
Commonwealth Con M Co	Cal	4	10	Nov	12	Feb	14	Mar	8	Chas A Morse	217 Sansome st
Columbia Smelting Co	California	1	10	Dec	15	Feb	2	Mar	27	D Maracovich	408 California st
Dudley M Co	Cal	11	10	Dec	7	Jan	10	Feb	3	E C Masten	309 Montgomery st
Equitable Tunnel M Co	Utah	24	10	Mar	8	Mar	8	Mar	8	J J McManus	227 Montgomery st
Eagle S M Co	Cal	15	10	Nov	15	Dec	15	Jan	15	J E Byrne	533 Kearny st
El Tesoro M Co	Lower Cal	9	25	Dec	6	Jan	18	Feb	8	W H Chickering	214 Sansome st
Flowers M Co	Nevada	4	10	Dec	16	Feb	20	Feb	20	W W Stetson	309 Montgomery st
Goldfield M Co	Nevada	4	10	Feb	21	Feb	21	Feb	21	Ed E Stetson	309 Montgomery st
Juniper M Co	California	11	25	Jan	19	Jan	12	Jan	31	E O Masten	309 Montgomery st
Martin White M Co	Nevada	8	25	Dec	17	Jan	26	Feb	23	J J Seaville	309 Montgomery st
Maryland Con G & S M Co	Cal	2	25	Aug	10	Dec	30	Jan	14	E P Faranworth	220 Sansome st
McIntosh & Co	Cal	10	10	Feb	10	Feb	10	Feb	10	W H Stetson	310 Pine st
Merchant M Co	Cal	5	15	Dec	4	Jan	3	Feb	2	S D Rodgers	Safe Deposit Bldg
Mount Auburn M Co	California	3	50	Nov	24	Dec	24	Jan	24	J F Newell	330 Pine st
Murchie M Co	Nevada	5	15	Dec	14	Jan	3	Feb	2	S D Rodgers	Safe Deposit Bldg
Nevada	Nevada	7	10	Jan	7	Feb	8	Feb	8	W H Stetson	327 Pine st
Oro M Co	Cal	6	10	Nov	15	Dec	18	Jan	18	Wm Stuart	320 Sansome st
Orion M Co	California	6	20	Nov	26	Dec	27	Jan	13	P Conklin	535 Market st
Pittsburg M Co	California	8	10	Dec	1	Jan	6	Jan	27	R Waggoner	414 California st
Pioneer Bell & Belle M Co	Arizona	1	10	Dec	1	Jan	24	Jan	24	J J Taylor	234 Montgomery st
Red Cloud Con M Co	Cal	9	15	Dec	8	Jan	13	Feb	7	W J Taylor	310 Pine st
Rowe M Co	Arizona	2	03	Dec	22	Jan	22	Feb	21	S D Rodgers	328 Montgomery st
South Pulver M Co	California	8	25	Dec	9	Jan	10	Feb	2	W Stewart	320 Sansome st
Silver King M Co	Nevada	13	10	Nov	16	Dec	16	Jan	10	W H Stetson	305 Montgomery st
Wide Awake Prospecting M Co	Cal Arizona	11	10	Oct	18	Dec	16	Jan	10	C Hildebrand	222 Sutter st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Argenta M Co	Nevada	E M Hall	327 Pine st	Annual	Jan 1st
Aurora Tunnel M Co	Nevada	C V Hubbard	310 Pine st	Annual	Jan 1st
Bullion M Co	Nevada	J M Brazell	328 Montgomery st	Annual	Jan 1st
California M Co	Nevada	C P Gordon	309 Montgomery st	Annual	Jan 1st
Viscodelta Virginia M Co	Nevada	A W Stephens	309 Montgomery st	Annual	Jan 1st
Gila River M Co	Arizona	W W Parrish	330 Pine st	Annual	Jan 1st
Henrietta G M Co	California	F Kleemann	707 Sansome st	Annual	Jan 1st
Idaho M Co	Nevada	C Mead	324 Pine st	Annual	Jan 1st
Loyola M Co	Nevada	W M Gillespie	411 1/2 California	Annual	Jan 1st
Kossuth M Co	California	E F Stone	36 1/2 Pine st	Annual	Jan 1st
Mountain G S M Co	California	R E Henriksen	213 Mission st	Annual	Jan 1st
Poconitos G M Co	California	A Staples	113 Leidesdorff st	Special	Jan 1st
Silver King M Co	Arizona	J Nash	323 Montgomery st	Annual	Jan 1st
Sierra Nevada G M Co	Nevada	E L Parker	309 Montgomery st	Annual	Jan 1st

### LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	60	Dec 2
Indian Queen M Co	—	Grove Adams	Mercantile Ex	10	Oct 2
Napa Con Quicksilver M Co	California	W W Farris	330 Pine at	10	Oct 3
Western Belt M & M Co	Cal	Wm Wells	303 Montgomery at	25	Dec 1
Silver King M Co	Arizona	J Nash	315 California at	10	Jan 1
Standard Con M Co (2)	California	Wm Willis	303 Montgomery at	75	Jan 1
Western M Co	California	C S Curtiss	303 Mo atgomery at	75	Dec 1

## The Mining Share Market.

Mining stocks have not shown any improvement at all this week. In fact a duller week could scarcely be imagined. Even the following telegram, sent on the 4th from Virginia, did no good: Sierra Nevada has opened the stopes in crosscut No. 1, run long since on the 2300 level, where ten ft. of ore was encountered. The ore is of good quality. Sinking has been resumed in the Union shaft. The station set is in at the 2500 level of the C. and C. shaft. To-morrow drill hole No. 5 will be started from the bottom of winze No. 1 in Union. The incline winze following the ore-streak below the 2100 level in Hale Norcross is working better again to-day.

To-day stopes were opened in the ten-foot streak of ore which was struck some time since in running crosscut No. 1 east on the 2300 level of the Sierra Nevada, 1,000 ft. north of the incline. This ore is of excellent quality.

On the 1st inst. California had \$84,819 on hand, and Con. Virginia had \$105,013.

The following companies had a balance on hand December 31, 1880: Western (Contention), \$204,583.02; Northern Belle, \$170,295.50; Con. Virginia, \$56,113.19 in cash and \$48,899.94 in bullion; California, \$25,432.55 in cash and \$59,336.17 in bullion; Eureka Con., \$54,538.55; Ophir, \$51,278.09; Standard Con., \$42,216.87; Bodie Con., \$35,073.47 in cash and \$15,000 in bullion; Best & Belcher, \$22,840.94; Gold & Curry, \$13,160.68; Union Con., \$2,716.69; Utah, \$3,180.98; Benton Con., \$31,382.78; Mexican, \$3,099.57; Double Standard, \$2,393; McClintock, \$530.97; Mono, \$448.57; Tioga Con., \$7,285.11; Booker, \$4,267.22; Summit, \$6,594.05; Belding, \$1,407.90; Montt Potosi, \$1,416.06; Bulwer Con., \$1,154.16; Northern King, \$204.83; Bismarek, \$1,340.30; Caledonia, \$319.79 in cash and \$20,740 balance of assessments to be collected; Exchequer, \$11,131.11; Ward, \$107,098.53; Independence, \$3,004.25; North Belle Isle, \$14,680.97; Argenta, \$7,211.44; Mount Diablo, \$6,225.21; Jupiter, \$4,029.11; Challenge, \$6,294.63; Silver Hill, \$15,635.02; Imperial, \$15,419.52; Chollar, \$37,601.20; Potosi, \$1,799.51; Occidental, \$8,711.69.

The following companies had an indebtedness at bank or otherwise, December 31st, 1880:

Overman	\$11,328.79; Bechtel Con.	\$4,244.24;
Holmes	\$711.10; Bullion	\$2,500 hills payable,
\$251,739.16, including	\$235,000 due the Ward	
company, Sierra Nevada	\$9,990.14; Hale &	
Norcross	\$16,639.64; Betty O'Neal	\$2,495.08;
Crown Point	\$14,524.85. Lady Washington	

\$7,514.28; Alta, balance of indebtedness  
3,398.51; Belle Isle \$3,756.09; Navajo \$2,970.58  
Grand Prize \$16,777.91 (the Grand Prize mine  
shipped \$21,000 in bullion January 3rd); Savage  
\$8,414.84; St. Louis 461.18.

### Bullion Shipments.

Under this heading we give all shipments since our last issue. We will be glad to receive further reports:

California, Jan. 3d, \$41,965; Union Con.  
Jan. 3d, \$20,624; Hillside, Jan. 1st, \$2,300  
Northern Belle, Dec. 27th, \$5,857; Bodie Con.  
Jan. 3d, \$6,173; Crismon Mammoth, Dec. 29th  
\$3,190; Pascoe, Dec. 29th, \$1,670; Germania  
Dec. 29th, \$2,000; Germania, Dec. 31st, \$5,000  
Barhee & Walker, Dec. 31st, \$2,368; Christy  
Dec. 31st, \$1,001.

A YEAR OF MINING.—The New York *Tribune* prints over two pages of tabular statements of the mining industry in the United States. It says: It will be seen from the statistics we present that the previous year has not been a favorable one for speculative mining operations. Stocks have as a rule gone down, and distrust has taken the place of buoyancy and exaggerated confidence. At the same time the business, regarded as a productive industry, has more than held its own. The number of dividend-paying companies has nearly doubled. The total yield of ore is remarkable. A steady and exceeding good percentage has been earned on capital actually invested in land, machinery and working expenses, while this industry is constantly expanding, conquering almost every month new fields, and drawing to itself additional forces in the way of capital and men.

STEAM COLLIER FOR THE PACIFIC.—By a private dispatch, it is learned that Henry Villar has purchased a new large steamer now being constructed at Roach & Son's shipyard at Chester, Penn., of about 3,100 tons dead weight capacity, 341 ft. long and 39 ft. beam, for the "Oregon Improvement Company." This steamer will be used in the coal trade between Puget Sound and San Francisco. The steamer was originally intended for the Texas line. She will be ready to start for the Pacific coast March 1st.

THE California Academy of Sciences has now 173 resident and 93 life members.

CALIFORNIA.

**AMADOR.**—**DRY-TOWN.**—Amador *Dispatch*, Jan. 1: The Potosi mine has temporarily suspended operations, owing to too much water being encountered in the new shaft. They will procure a new boiler, however, and commence work again in the old shaft at the 200 level. The last cleanup at the mine yielded an average of \$9 per ton. Rumor has it that Mr. J. W. Perry has been installed as Superintendent of the Empire mine at Plymouth, the place recently filled by Mr. Mohrmerv.

**SUTTER CREEK.—Ledger, Jan. 1:** This mines are plodding along at the usual gait, and a lively spring is looked for. Sinking at the Eureka is nearly completed. In a few days tunneling will be under way. At the Mahoney things are looking well. This ore is good in quality, and plenty of it to keep the mill going steadily. In the spring a fine pump will doubtless be put in to ensble the lower levels to be worked.

Near Middle bar, which has been idle for a week or more, is to be prospected energetically. Mr. Nash, one of the owners, was expected up this week to start operations. Machinery for the proposed tunnel through Murphy's ridge has arrived on the ground. That looks like business. It is cheering to be able to report that the prospects of the Oneida mine have greatly improved of late. An ore body of good grade has been encountered in one of the upper levels. Forty stamps of the mill are kept constantly running. The mill is expected to be in full operation this Thursday evening. A patent has been received for the Plymouth Rock quartz mine and mill site; John Evans and Philip Kearbes claimants. This mine is located a short distance from Plymouth.

BUTTE.

**NEW QUARTZ MILL.**—Oroville *Mercury*, Dec. 31: John Rhodes and J. B. Treadwell have made arrangements with Augustus Tache, and will put up a mill on his quartz ledge. This ledge is situated a short distance above Oregon City, and as yet is only partially developed. An incline has been run to the depth of 40 ft, following the vein down, and a shaft has been sunk on it to a depth of about 40 ft. The vein is about 4 ft wide, and is quite rich.

**THE SAVERCROFT MINE.**—Butte Record, Jan. 1: Mr. C. W. Reed, of Sacramento, Superintendent of the Savercroft mine, came up last night. Mr. Reed states that the new 40-stamp mill is nearly completed, it having been the intention of the company to put it in operation on January 1st, but owing to the recent storm, the workmen were interfered with to a considerable extent. The mill will be run by water power, and is so located that the rock can be brought to the mill at little expense. Mr. Reed states that during the coming summer he intends to show some of the country the workings of the mill as they are now.

THE JACKSON.—This new mine, in a new mining locality

seems to have a brilliant future before it. The company has been at great expense. The first thing to do was to get water to the claim; in order to do this the company has put in a saw mill, which is turning out from 15,000 to 20,000 ft. of lumber per day. As this mill is located in excellent timber and is on the Lassen trail, it will afford a supply of excellent lumber for the southern part of Tuolumne county and the northern part of Butte. The company has exclusive control of the water, which exists in great abundance during the entire season. The company

Mr. Squires, Superintendent of the company, says that it is his intention to improve the old Lassen trail and make the ingress and egress of the mines over that route.

CALAVERAS

KNOX & OSBORN MILL.—*Calaveras Chronicle*, Jan. 1. The 20-stamp mill, with the rock breaker and the Frue and Blatchley concentrators, all running in tip-toe order. The entire machinery is run by a Miners' foundry water wheel, requiring only 45 inches of water. The mill has a capacity of 40 tons per day, and the rock breaker can crush 80 tons in 10 hours. Four Frue machines take care of the sulphurets from 10 stamps, while the Blatchley machines consist of 8 tables, each taking care of 10 sulphurets from the other 10 stamps, and it is thought can do the work for 20 stamps. The mill is a good one and is doing very satisfactory work. From 12 to 15 men have been constantly at work in the mine since our last report keeping the mill supplied with quartz. It requires 2 men to deliver the quartz at the mill—2 in the day and at night—5 men, with 1 man on the crusher, tend the mill at all night. The mill is in the best of order, especially in the line of the west tunnel, which is the most advanced of any work in the mine. Several important outside improvements to this splendid property have been made since our last account, chief of which is a wagon road from the mill to the head of Alexandria gulch, where the company has been getting out soapstone, with which to erect a chloridizing furnace. Lastly, a charcoal retort, with capacity for 350 barrels, has been erected, and 350 barrels having just been burned. This is the second retort of the kind ever put up in California, the first having been put up some years since by Mr. Osborn in Napa county. The charcoal from these ovens or retorts is much superior to that procured from mound pits. Everything in and about the Knox & Osborn mine presents life and activity. Col. Robinson, the Superintendent, is in the mill, and Mr. Allen, the manager, is in the mine in mining operations; while Messrs. Allen & Osborn, who have charge of the mill, are equally experienced in their line.

INYO.

**SNEETING.**—*Inyo Independent*, Jan. 1: The last run of the Defiance furnace at Darwin, which last week shut down for a short time, yielded 4,422 bars of base bullion. Counting the average weight 35 lbs, this would amount to nearly 158 tons. During 48 hours on the 23d and 24th of December 653 bars were run out, of 25½ tons weight. The furnace was kept right along afterwards. It is the best furnace only and the yield in that length of time is the best yet attained in this county, or probably anywhere else with a furnace of the same class. Upon one occasion at Cerro Gordo a run of 305 bars was accomplished in 24 hours, but for some cause or other the furnace was cooled off the next day.

DEEP SPRINGS.—W. A. Greenly was in from Deep Springs a day or two ago, and reported that all the mines being worked "look a great deal better than the owners expected"—which is saying considerable. Samples of ore from a new location on the Indian Scout ledge, assayed by Mr. Woodbush, yielded an average of \$58 per ton.

**PANAMINT.** The business of mining and milling has been steadily carried on in Panamint for some time past to the handsome profit of chloriders and all interested. Many of the unpatented mines are being relocated. A important strike is reported in the 900 level of the Wyoming, samples of which have been sent to the old company at San Francisco. Some Eastern parties recently there propose either buying the big mill of the Surprise Valley Mill & Water Co. or else putting up entirely new works.

**MARIPOSA.**—MERCEZ HYDRAULIC CO.—Mariposa Gazette, Jan. 1: The extensive works of this company at this site at Red Bank, near Merced, have been completed, and the plant is in a prosperous condition. We learn that the late rains have given an ample supply of water for all purposes of hydraulicizing the rich belt of dirt and gravel which is almost inexhaustible, at least for many years to come. The splendid machinery which comprises a large-sized giant, pipes, penstock and derricks, is all first-class; constructed and placed upon the works by the same hands, and under the same management, as the works at Merced, and under the same management, as the works at Col. Swadley. The company at present employ a force of 20 men, which number will probably be in-



creased as the mine develops and increases its resources, which it has at command.

**MURRAY'S PATENT SLUICE BOX.**—Murray's sluice box, for which he has recently obtained a patent, is commanding public attention, and is said to be an important improvement on mining implements, by which gold is saved from the dirt and gravel, which as a general thing a large percentage lose. One of the excellent features of this invention is that it will dissolve all clay formation of a putty nature that is susceptible of being dissolved by application of water, a difficulty which exists in most of the placer mines.

#### NEVADA.

**SEABASTOPOL MINER.**—Grass Valley Union, Dec. 30: The second clean-up of rock from the Seabastopol mine has been made at Sothern's mill, from a run of 90 tons, which yielded \$22 per ton, not including sulphurets, which at the first clean-up went at the rate of \$50 per ton. The yield of this crushing is a decided improvement on the first one that was made, but it does not yet come up to what is expected from the rock when the regular pay chute, which is now driven for, is reached, and which is found in the upper level. There are now about 100 tons of quartz on the dump at the mine, of the same character as the above, which will be bailed to the mill as soon as the condition of the weather and roads will permit. The Seabastopol is showing very well so far as developments have been made, and there is every present encouragement that it will prove a good mine.

**RICH QUARTZ IN THE ROCKY BAR.**—More rich quartz has been struck in the Rocky Bar mine, on the upper or Rocky Bar ledge, within the past week, and it comes from the vicinity where the rich specimen quartz was found some months ago. Last week the first of this good rock was found, and on Tuesday several boxes were taken out and crushed in the batteries of the mill. It is not known whether it is going to turn out as rich a strike as the former one, but it demonstrates that that portion of the mine has not been exhausted of its treasures.

**A FINE CLAIM SECURED.**—Jan. 20: The Cowger Bros., whose claims are situated at Snow Point, above Moore's Flat, yesterday brought down \$9,000 worth of gold dust from their claims, the result of a recent clean-up. Among the batch was a lot of specimens, some of which were very handsome. We hope to hear of other claims, now that water has come, bringing in their regular monthly harvests of gold.

**MEXICO SALT POKES.**—*San Francisco*, Jan. 1: The Mackeral Basin hydraulic mine, located at Scott's flat, in this country, changed hands last week, Messrs. Wheeler & Rogers, who have been mining for years out on Rattlesnake creek, being the purchasers. Parties well acquainted with the property speak very highly of it, and as the new proprietors are both good practical miners, and will proceed at once to place the mine in the best working condition, we hope to hear soon that they have added another to the list of dividend-paying mines of the country.

#### PLACER.

**NEW MILL.**—*Placer Herald*, Jan. 1: The new mill on the Auburn and Rock Creek mine has been started up and works first rate. The large pile of ore taken out of the mine while the mill was building is being put through, and from all indications it is going to pay well. Reports say that a strike has recently been made in this mine of uncommonly rich ore.

The Conrad mine, on Duncan hill, continues very rich. A crushing of about 50 tons of rock taken out in extending the drifts is about to be put through the Pelster mill. The rock taken out continues to show a great deal of free gold. A party who was at the mine a few days ago tells us he saw a piece nearly as large as a man's head taken out that day the last time he was there.

The Rising Sun quartz mine at Colfax, the banner quartz mine of the county, is undoubtedly entitled to that distinction. This mine has long been among the list of dividend payers, and from the best accounts at hand it seems to be getting better as it is further developed. We were shown a specimen of the rock that had recently been taken from the 500 level which was surprisingly rich. It showed abundantly of free gold, and otherwise possessed characteristics indicative of the very best kind of rock. This is a good mine, with good works and is ably managed.

**NORTH RAVINE.**—*Cor. Placer Herald*, Jan. 1: T. J. Hunter is having a lot of very rich ore crushed at Eaton & Hammond's mill, which, by the way, deserves special mention. Mr. Eaton is well known as the former owner of the St. Patrick mine. James Hammond is the son of the patentee of the mill which is known as the Hammond patent. The mill is a 5-stamp one. It is run by water power from North ravine. The wheel is an overshot 10 ft in diameter. As far as my judgment goes I consider it far superior to the old stamp mill in use. Mr. Fancher has an improved gold-saving machine, through which the water passes from the amalgamator. This invention is Mr. Fancher's and should be used by all mills not having pans. The Crandall mine is being re-opened by J. R. Mains, with promising results. This is one of the oldest quartz mines in the county. The old tunnel is being re-opened (the outside cut having caved in) which is 150 ft in diameter, and will tap the old shaft about 90 ft from the surface. At the present writing the stamps at Pelster's mill are still. Mr. Goode is going to start up his mine, which is the one immediately below the Mark L. mine, which adjoins the Hunter mine. This mine is full of free gold, and is undoubtedly very rich. On the north side of the ravine, Bald hill, Hunter has bonded his extension to his mine to a Reno company, the members of which have arrived to commence operations. The Sacramento mine is owned by B. Frank Smith and Warren Starr, of Sacramento. For some reason they are letting their mine lie idle, but rumor has it they contemplate putting up a 10-stamp mill.

#### PLUMAS.

**THE MONTE CRISTO.**—*Plumas National*, Dec. 25: Capt. Smith and Mr. Parsons came down from the Peak on Tuesday, and gave us a call. Work is booming along, us usual, and the old prospects are steadily increasing. The main tunnel is being steadily driven forward, but has lately been "going slow," as the tunnel had to be driven directly through a bowlder for 57 ft. The workmen broke through a few days ago, however, and have since been in pipe-clay, with 8 inches of rich blue gravel above the track, and, as no shaft has been sunk, it is impossible to say how much is below them. The gravel prospects from 10 to 20 cents to the pan. Fine gravel is also being developed in one of the west crosscuts, and the outlook, generally, is first-class. The drill works well, and the "bowlder" spoken of gave a good opportunity to test its merits. With ordinary hand drilling it would have been an endless job to pass through it. The water still continues to run steadily from the tunnel, and lately the volume has not decreased. This strike of water will prove valuable, as there is enough of it, if a reservoir is provided, to wash large quantities of drift dirt, and, if held out, the necessary tanks will be built. The managers of the Monte Cristo are in high spirits, and confident that during the run of water, next spring, they will prove the mine to be one of the "bonanzas of the land."

**ANTLOPE.**—*Oreenville Bulletin*, Dec. 23: This company is now running a tunnel to tap their ledge, near the Arcadia.

**SOUTH EVERA CON.**—The new mill is almost completed and will be ready for work to commence in a few days.

**OLD STRIPS.**—The mill is running steadily and the Lawrence ledge is opening well, showing large resources of good ore.

**INDIAN VALLEY.**—Only about 25 ft more of solid rock are to be cut through to complete the tunnel, and then pay rock will be taken out.

**PLUMAS NATIONAL.**—The new furnace is now ready to start, and about 600 tons of sulphurets are on hand ready to be worked. The Erie concentrators will save about 90% of the sulphurets. Maj. Rodgers, the Sec'y of the company, will be here this week.

**GREEN MOUNTAIN.**—The 2 fine mills of this company have been running steadily, and the storms have not interfered with their working, so well arranged is everything connected with the ditch and tramway. Last Saturday

pay ore was struck in the face of the No. 5 tunnel, or present main level of the mine, indicating the approach of the main pay chute of ore in the shaft above. This is but another evidence of the permanency and success of this splendid property. There is no difficulty in supplying an abundance of ore for both mills. The new tramway transports in 10 hours are enough to run the mill for 24 hours.

**CURKOREK.**—The almost incessant storms of the past 2 weeks have rendered it very difficult to haul ore to the mill. The hoisting works are being rapidly arranged, the pump is in place in the shaft and a double force of mechanics will probably be put on to have the machinery going by Saturday. A donkey engine has heretofore been adequate to hoist both the ore and water, but since the late warm rains the water has so increased that heavier machinery is necessary.

#### SIERRA.

**BLACK JACK MINE.**—*Nevada City Transcript*, Dec. 20: On Thursday last a snowslide occurred at the Black Jack mine, Sierra county, which completely demolished the blacksmith shop and nearly crushed the mine. The works are situated at the base of a mountain which rises very abruptly for a distance of about 500 ft. The rain falling upon the snow, which was some 8 ft deep, made it so heavy that it was precipitated into the flat, carrying the building, trees, boulders, etc., in its headlong course. Fortunately the mill was off the line of the slide, and escaped injury.

**HOO CANYON.**—*Mountain Messenger*, Jan. 1: Work is to be pushed on the Uncas claim at Hog canyon. The company has driven a tunnel at the old mill, and propose to drive it ahead until they strike serpentine. There is much wealth in that canyon yet.

**GOLD BLUFF.**—We are informed that they have struck a ledge of good ore, 4 ft wide, in the upper workings of the Gold Bluff mine. The existence of this ledge was not suspected until lately. As we are informed, the ledge, when worked years ago, seemed to pinch out, and was lost, and by failure to drive a tunnel in the right direction, was discovered. Mr. Van Slyke, the present owner of most of the mine, had different ideas from the old owners, and proved them correct by running in different directions, with the above result.

**HASKEL PEAK.**—This energetic and persevering mining company, Sierra City, has sunk a shaft 828 ft from the mouth, and at the face of their main tunnel, 45 ft of bedrock, passing through 30 ft of pipe clay and 15 ft of washed quartz gravel, bedrock pitching steep. Thus far there has been no gold, but everything indicates they are in the rim rock. A new contract of 200 ft has been let. When that is completed, sinking will be resumed, and so on *ad infinitum* until either a gold channel is reached, or the last spark of hope has been extinguished in the hearts of the determined prospectors, who are so vigorously engaged in the development of the mineral resources of eastern Sierra.

#### SISKIYOU.

**RIVER CLAIMS.**—*Democratic Times*, Dec. 31: The river claims on the Klamath, in Siskiyou county, have yielded well during the past year, and in some cases immensely. Several excellent quartz ledges are also being worked in that county at present. Unusual activity in mining now exists there, and it promises to increase during 1881. A new era in the prosperity of northern California is dawning.

#### TUOLUMNE.

**ITEMS.**—*Sonoma Independent*, Jan. 1: A strike was made in the Rough & Ready graveling, in Table mountain, and, very recently, which is said to be a big thing. New gold has been discovered in the Keltz mine, and operations will be carried on with more vigor than ever. On the 19th ult. A. Colby & Co. are said to have taken out 50 ounces of gold from the Big Nugget claim, on Oliver Cowan's premises. The vein is a continuation of the Bonanza mine. Supt. Wetmore is busily engaged in repairing a big cave in the Golden Gate mine. The sound of the busy stamps can be distinctly heard in Sonoma during 1881. Mr. Van Slyke, now prospecting general companies of Chinamen, are engaged in mining over the old tallings on Woods' creek—often coming on "new dirt" that pays very handsomely.

#### NEVADA.

##### WASHOE DISTRICT.

The following statements, made by Superintendents, are for week ending Jan. 1:

**YELLOW JACKET.**—At the Suro tunnel level we have extended the northeast drift to a point 90 ft from the shaft, or to the proposed line of the tunnel. We are to-day making a turn to the north 15° west. The ground has been more favorable for speedy work. We are employed in the shaft easing around the timbers and doing some repairs on the incline from the old south shaft.

**CALIFORNIA.**—During the past week there have been extracted and sent to the mills 279 tons of ore of the assay value of \$24.28. During the week there were \$41,065.04 in bullion shipped. On the 25th level we have commenced the drain and enlarging the connection of the joint Ophir east crosscut has been extended 37 ft, and the joint Union Con. east crosscut 17 ft. On the 2500 level the south drift from the Ophir level has been extended 33 ft, and the joint Ophir upraise 15 ft.

**UNION CON.**—During the week 212½ tons of ore have been taken out and sent to the mills; assay value, \$20.03. During the week bullion to the value of \$20,624.75 has been shipped. On the 2500 level the joint Mexican west crosscut has been extended 16 ft; joint Mexican west crosscut 10 ft. A station is being cut out at the bottom of No. 1 winze.

**SIERRA NEVADA.**—On the 2300 level the incline has been extended 20 ft; total, 420 ft. On the 2500 level the crosscut has been advanced 25 ft; total, 70 ft, and the joint east crosscut 27 ft; total, 179 ft. During the week 131 tons and 800 lbs of ore were raised.

**MEXICAN.**—On the 2500 level the joint Ophir east winze has been sunk and timbered 14 ft; and joint Union Con. east crosscut 20 ft.

**UTAH.**—Since last report the east drift on the 2150 level has been extended 15 ft. On the 1950 level we have run a diamond drill 190 ft in an easterly direction, and, on account of the breaking of the drill-rod, were obliged to discontinue.

**OPHIR.**—On the 2500 level the joint Mexican east winze has been sunk and timbered 14 ft; the joint Mexican west crosscut 21 ft, and the joint California upraise 15 ft. On the 2300 level the joint California east crosscut has been advanced 37 ft.

**CON. VIRGINIA.**—During the week 999 tons of ore have been extracted and sent to the mills; average assay, \$37.45. On the 2300 level the south lateral drift has been advanced 17 ft.

**UNION SHAF.**—Cutting out tank-pit at the 1600 level, boulders on 2300 level, casing timbers at 2400 station and reinforcing strapping plates on the pump rod.

**C. & C. SHAFT.**—During the week the shaft has been sunk and timbered 10 ft; total depth below the 2300 level, 194 ft.

##### ESMERALDA DISTRICT.

**REAL DEL MONTE.**—*Esmeralda Herald*, Jan. 1: The foundation of the surface hoist, which commenced working on Sunday last, has been braced up and made secure for the present. When the 750 bob is completed a few days hence, another plunger pump put in and connections all made, the surface bob will be relieved of a good deal of the work now performed, and Supt. Tyrrell thinks it possible the foundation may last some months yet.

##### GRANTSVILLE DISTRICT.

**THE CENTENNIAL.**—*Oranville Bonanza*, Jan. 1: Work on the Centennial is steadily going ahead, with the most flattering results. The ledge in the bottom of the shaft is the full width of the same, but the ore is of a better character than any yet taken out. It is the intention of this company to build a 20-stamp mill the coming summer.

**THE ALEXANDER.**—Work in the Alexander mine is going ahead with the usual vigor, and the great extent of the ore bodies is fully realizing the anticipations of the management. A large and commodious ore house has recently

been erected, from which the ore is sent to the mill with great dispatch.

**THE BROOKLYN.**—The Brooklyn is furnishing an abundant supply of rich ore, and daily improves in extent as developments progress. A convenient ore house has been erected at the dump.

**THE ISA.**—This is a mine of great promise as a bullion producer, and is located on the great ore channel of the district. Thomas K. Murphy, the owner, is at present engaged with a force of men sinking 2 shafts 500 ft apart, which are producing payable ore.

**THE POTOSI.**—In the Potosi the work of sinking progress rapidly. The bottom of the shaft is in sulphur ore of a high grade, and the mine promises to be not an unworthy rival of the Brooklyn.

**THE HOMESTEAD.**—A very promising sulphuret formation has been struck in the Homestead below the water level. An incline is being sunk through this formation and the mine is improving every day.

**THE ALEXANDER MILL.**—The Alexander mill still runs along without a stop or a break, and its bullion product for the month will be larger than it has been for many months.

#### I X L DISTRICT.

**BAYFIELD CO.**—*Eureka Sentinel*, Dec. 20: Capitalists, both in Chicago and New York, are endeavoring to make negotiations to purchase the I X L mine, and to develop it. They have also offers from different sources to erect a mill and reduction works on shares. The mine is certainly a good one. At present the main shaft is down 215 ft, and drifting has been begun at this point, and at last accounts the mine was looking splendidly.

#### LEWIS DISTRICT.

**ANOTHER DIVIDEND.**—*Silver State*, Dec. 23: The Star & Grove mining company, of Lewis district, has declared another dividend of \$20,000, payable immediately. The mine is proving to be one of the best in the State.

#### MINERAL HILL DISTRICT.

**WORK.**—*Cor. Eureka Sentinel*, Jan. 1: No great amount of mining work is being done at present. The Austin and Spencer Co.'s are employing a few men, and it is not probable their force will be increased during the winter. There are quite a number of private parties working claims on the hill, with very good results. A shipment of ore from the Friday mine last week returned a handsome remuneration to the proprietors, and it is said another shipment will shortly follow.

#### OSCEOLA DISTRICT.

**OSCEOLA DISTRICT.**—*Ward Reflex*, Jan. 1: Boone Tilford and partner, we learn from Wm. Taber, who returned from Osceola a few days ago, are taking out \$22 a day from their placer claim in Dry gulch. They get enough water for their rocker by molting snow. If their ground holds out, they are liable to make a "killing."

#### SILVER CANYON DISTRICT.

**STARTED UP.**—*Ward Reflex*, Jan. 1: The mill at Silver Canyon, we learn from W. McGill, started up, on the 27th of December, on ore from the Sadie L. mine. In the event it works the ore of that section successfully, all old White Piners will begin to brace up. The result will be watched with interest.

#### TAYLOR DISTRICT.

**DEVELOPMENT.**—*Ward Reflex*, Jan. 1: During the past year considerable quiet work has been going on in Taylor district, situated 12 miles easterly direction from Ward. The developments made have been of such a satisfactory nature that Robt. Briggs, W. N. McGill and W. G. Lyons have concluded to put up their mill near the head of Steptoe creek for the purpose of working ore from mines in the district. All arrangements have been made and the mill will be erected as early as possible. Taylor is by no means a new district, the first location having been made within its boundaries quite as early as in Ward. The first locators looking either in means or energy the camp languished, and at one time was entirely deserted. A few having a knowledge of the richness of the mines did not propose that the district should be abandoned. The mines becoming relocatable, the present owners were not slow in taking advantage of the opportunity thus offered to take them up. From the Self-Cocker, Sunrise and Brech-Loader 35 or 40 tons of ore have been shipped lately to Salt Lake City for reduction, that averaged over \$300 a ton. Jas. Hixon and Chas. Peck are at work on the Sunrise, and taking out ore that will pay to ship. They are also working on shares. Work will soon be commenced on what was once known as the Prince mine, now owned by Briggs & Lyons. Three thousand tons of good milling ore, it is estimated, is in sight in the district. A large percentage of the ore is as rich as they find it anywhere, and well calculated to make men with any knowledge of mining take hold.

#### UNION DISTRICT.

**ATTRACTING ATTENTION.**—*Cor. Eureka Sentinel*, Jan. 1: This district is attracting considerable attention, and seems to be having a boom. Quite a number of men have gone, and others are going in daily. Work will be actively prosecuted on the Independence, Grand Treasure, Victoria, Star and some of the other principal mines during the winter. There is a proposition to consolidate some of the mines in Union district and erect a furnace, but whether it will be consummated this winter is not yet apparent. It is to be hoped that something of the kind will be done, and then a boom in Union will set in earnest; and when it does we predict a more rapid increase in population than has been witnessed in any mining camp for several years. The mines are there, and all that is needed is a little capital, and the sooner some enterprising individuals or company take hold the sooner prosperity will come to the camp.

#### WARD DISTRICT.

**MARTIN WHITE.**—*Ward Reflex*, Jan. 1: Another crosscut has been started north in the tunnel 2,900 ft from the mouth. The crosscut, 2,400 ft from the mouth, is looking favorable. Considerable water is at present coming in.

**BONDEN ORE MORE.**—From Dave Felsenthal we learn that the Munroe & Linton mine (Credit Mobilier) has been bonded again; this time to Omaha parties, for \$40,000. The sum of \$1,500 is to be paid on the 1st of March and the remainder of the cash for the year. This is the 3d time that these mines have been bonded, but it is no fault of the mines that they were not sold.

#### ARIZONA.

**OLDBEY MINE.**—*Silver Belt*, Dec. 26: The Belgium mine is 14 miles from Oldbe, on a huge vein. There are several openings on it, from all of which ore has been taken. In the combination shaft, on the northeast end of the location, the north wall has been cut into about 3 ft, and the line of the ledge shown on the ends of the shaft is as true as a rivet. Some of the ore taken out carried 30% of copper, and assays of 100 ounces to the ton have been had. The ore is of a high grade, and the mine is well developed. A large price, and thought Doc. Wilson, who sold it, had the best of the bargain, but Mr. Helling's appears to have known best. Two hundred and thirty tons of the ore have been worked by the Oldbe City M. & M. Co., and the product has been, with the present clean-up, almost \$30,000. It is, for a small mine, a perfect marvel. The mill is totally unable to keep the dumps clear. A 10-stamp mill could not do it. The vein is 3 ft thick. In the level are 3 veins, each 2 ft thick; all of them containing good milling ore, and the ore next the footwall is as rich as anything yet discovered in the mine. Mr. Helling's ships, this week, \$5,350 worth of bullion. The Great Republic, owned by Larro & Ford, on the south side of the Pinal mountains, is producing excellent ore. The pay streak is 20 inches wide.

**ALICE ORE.**—The plans for a 10-stamp mill is running now on Alice ore. The plans for a 10-stamp mill for the Centennial company have arrived. Mr. Rice, who, with Mr. Palmer, has the contract for erecting the mill, helped to arrange the details of the plan with the Pacific Iron Works, and the result is that the company will have a perfect mill. There will be a Howell & White roaster, and the most approved style of kiln for ore drying. The new road to McMillen, via California mine and Bick's camp, is finished, and last Wednesday they commenced to haul

ore over it. They have struck ore in the La Plata of precisely the same character as the Mack Morris is producing. Both mines are on the same ledge.

**MESSEURS FLAVERS.**—*Arizona Sentinel*, Dec. 25: Mr. L. J. Shaw came in from the Mesquite placers yesterday, and reports that the late heavy rains had interfered somewhat with dry washing for the past week. Some very rich strikes have been made there in the last few days, and more attention has been paid to quartz claims than heretofore. Messrs. Thurlow, Downey and Lyons are still taking out an immense amount of gold from their claim. This is one of the richest claims in the district, and will make millions of dollars for all parties interested. Mr. Shaw has just finished the assessment work on the Essex, and at 15 ft down in the shaft struck some very good looking quartz carrying free gold. He will still continue work on this mine and put down a shaft of 100 ft.

**TIPTOP DISTRICT.**—*Arizona Miner*, Dec. 31: Jake Marks, who went out to the Tiptop a few days since for the purpose of meeting capitalists from San Francisco, has returned and gives us the following news from that section: According to understanding, he met Mr. Charles Foreman, of the Overman mine, in Virginia City, who examined the various mining properties in the district, of which he was favorably impressed and may negotiate their purchase. Mr. Weber, of the Tiptop mine, has bonded the Buena Vista lode in Humburg, Silver Mountain district, in the sum of \$30,000, and put a force of men at work running tunnels and a shaft 100 ft deep. He is enthusiastic over this property and will give it a fair test. The Tiptop mine is looking extremely fine, yielding good ore, while the mill is still running, turning out bullion. Never has the Tiptop mine and camp presented a more favorable appearance than at the present time.

#### IDAHO.

**BAY HORSE DISTRICT.**—*Yankee Fork Herald*, Dec. 23: The Liverview, a location made in '73 by Frank Milhoan & George Harland, is developing into one of the most promising in Bay Horse district. The owners of the mine since leased it to E. K. Davis and Thos. Higgins for a period of 6 months, and the ore vein, since they commenced work on it, has widened out to 5 ft, 30 inches of which is solid galena ore carrying from 300 to 1,500 ounces of silver per ton. Four men are at work in the mine, taking out from 3 to 5 tons of ore per day, 2 tons of which is high grade. The Post Boy is improving with development, and is getting a large quantity of high grade ore. The Kansas is getting out the usual fine quality of ore for which that vein is noted. The Utah Boy and Silver Wing are also turning out much good ore. Kelley & Watson are working their locations, and fine ore in abundance is accumulating on the dump. Taking the mines together and there will be much work for the smelter when it starts up in the spring, and Bay Horse will be a lively camp next season.

The Salmon river mining camps will all take a big jump upward next season. The mines have developed sufficiently the past summer and fall to guarantee this.

The mines on Squaw creek, a tributary of the Salmon, and about 22 miles south of Bonanza, are producing much ore this winter, which will be reduced at the Kinnikinnick smelting works.

#### MONTANA.

**SILVER BOW ROASTER.**—*Butte Miner*, Dec. 29: The Silver Bow mill, which has been closed down for the past week to permit of the proper connections being made between the machinery of the old building and that of the room in which the Howell roaster has recently been erected, will resume operations to-day. The mining interests of the camp will be materially benefited by the Silver Bow roaster. The character of much of the ore produced from a certain class of prospects, while not adapted to the free mill process, is nevertheless, unavailable for cheap and efficient smelting. It is on this account, and the fact that the Silver Bow Co. has provided facilities for its treatment it may be expected that a number of prospects which have heretofore been idle will start into operation.

**MAGNA CHARTA.**—The east and west drifts from the face of the north crosscut are being vigorously forwarded on a fine body of ore. Stopping has been commenced, and the necessary preparations are being made for the extensive extraction of ore as soon as it may be required for treatment. At present only a small force of men is employed, and the production is as yet limited to about 6 tons per diem.

**MOULTON.**—Affairs at the Moulton are decidedly animated. The frame work for the hoisting works is almost completed, and the erection of the building will be begun this morning. The site for the new mill has at last been definitely determined upon.

**BELL.**—The Bell is constantly adding to its fame as a producer of high grade ore. The ore which yesterday came out of the middle shaft was marvelously rich, many of the pieces being covered on all sides with native silver. The Bell is assuredly the richest property in the camp, and one of the most valuable in the Territory, for not only is the ore rich but the vein is unusually wide and possesses every characteristic of permanency, and what is equally gratifying the ore improves in quality with the attainment of depth.

**ANSELMO.**—The main shaft has attained a depth of 170 ft. The new shaft is being sunk with expedition and is about 110 ft deep. The stopes in the 70 level, which connect the 2 shafts, are being vigorously worked and are yielding a fine quality of ore, as is also the drift running west from the new shaft at a depth of 70 ft. Some shipments of ore are being made to the Silver Bow mill.

**STEVENS.**—The ore in the bottom of the new shaft is improving daily. The walls continue smooth and regular, and the ore body is compact and clean.

The ore in the old Alice mill is being chloridized to a higher percentage than ever before. The chlorination for the past month has averaged 0.1% of the assay value—a most excellent showing and one that is seldom beaten in any camp, the character of the ore being good.

The new Alice mill was started into operation on Monday and will hereafter run continuously.

DONNELLY, CLARR & LARABIE yesterday shipped 6 bars of Elkhorn bullion valued at \$2,000.

#### OREGON.

**ITEMS.**—*Democratic Times*, Dec. 31: There is a full head of water at the Sterling mine, and Supt. Ennis is happy. Chappel & Co., at Star gulch, are enabled to run 6 hours a day with the aid of their reservoir. Hays & Magruder started their pipes agoing the forepart of the week, and are moving the dirt at a lively rate. It has been raining hard in Josephine county, and the miners have plenty of water and are busily at work. A good run seems prospective. Nearly every miner in Jackson and Josephine counties has more or less water available, and all are making the best of it. The season opens quite favorably, with pleasant weather prevailing all the while, and visions of gold dust haunt the hopeful delver of the earth.

#### UTAH.

**SILVER REEF.**—*Miner*, Dec. 29: The Stormont mill resumed operations the latter part of last week, and the stamps are again getting away with the usual amount of argentiferous sandstone. The bullion product of Silver Reef for the year 1880 may be estimated at over \$1,050,000, an average of nearly \$50,000 to the single stamp. This is more solid silver to the stamp than any other camp on the coast can boast of. The cage for the new Buckeye shaft was completed last Friday, and on its first trial worked to a charm. Mr. Walker, the company's blacksmith, is an expert mechanic, and we have seldom seen a job perfected in better shape than the iron work of the new cage.

**MILL CLEAN-UP.**—*Salt Lake Tribune*, Dec. 23: Yesterday Mr. Alexander Graham, of Cedar Falls, Iowa, who has been engaged in running the Tintic M. Co.'s mill, brought to the city 26 bars of silver bullion, valued at \$20,000. The mill is the old Wyoming, and the ore was mostly obtained from the Northern Spy, a new prospect opened in October. The product of the mill is silver, and particularly so to Mr. Graham, who claims to be a novice in mining.



## Irrigation and Water Rights.

State Engineer W. H. Hall, has made to the Governor the following supplemental report on the water question in California:

Conflicts of interest, for whose adjustment the present laws afford no adequate method, keep matters connected with water rights for irrigation in such an unsettled condition that there is no basis of credit upon which to raise money for the construction of irrigation works, and no certainty in farming with irrigation, except in cases where all rights can be monopolized or brought under one control, and these instances are few.

Two general classes of conflicts have made themselves known throughout the counties where irrigation is now practiced, namely:

Conflicts between rival appropriators of water, or claimants by prescription; and,

Conflicts between appropriators, or claimants by prescription, and riparian owners.

Of course there are an infinite number of sub-varieties of cases which come up under each of the general classes.

In the San Joaquin valley, not only are these conflicting interests present, but another element will soon make its appearance (indeed it has already), and we will have inevitably, unless the State controls and directs the diversion of waters from the San Joaquin river and its tributaries.

The worst conflict of all, namely: that between the appropriators of waters for irrigation, and the navigation interests on the main river.

### Proposed Settlement of Conflicts.

The question is, how to do away with this clashing of interests.

To settle conflicts between appropriators or claimants by prescription, it has been proposed—and I find the plan advocated by many worthy people in the irrigation regions—that the State take charge of the whole matter of irrigation—condemn and pay for all existing rights to water, for the public benefit, construct the works of irrigation, and sell the water.

As a variation to this, others advocate an apportionment of the waters, after being condemned for the public good, and paid for by the State, to the lands requiring them.

And again, other people would have all water rights condemned, but paid for by the lands to be benefited in each instance.

I do not think any such plan is feasible, and for the following reasons:

First—The outlay for the satisfaction of existing water claims would necessarily be so great that the State could not be brought to undertake the settlement.

Second—If the State should undertake the construction of irrigation canals, or works of irrigation proper, her enterprise would fail of success, and involve her in enormous expenditures of money.

(See Chapter V, of Part IV, Report of State Engineer, January, 1880.)

Third—If the State should reapportion the waters, the supply would not be sufficient for all, and the conflict would be as great as ever.

Fourth—The conflict between users of water for irrigation and claimants under the riparian principle would still exist, and could not be done away with by condemnation—for the field is immeasurably too great.

Fifth—The conflict between users of water for irrigation and the navigation interests would still exist, and it is altogether impracticable to condemn the right of navigating a public stream.

### Riparians vs. Appropriators.

It has been proposed to limit the rights of riparian proprietors to water privileges for the use of stock and domestic purposes. While I heartily concur in this as a correct—in fact, the only admissible—definition of a riparian right in an irrigation country, I see very clearly how the State, by making this simple declaration and doing no more, will strike a blow at one (the riparian) class of interests, without clearing up the horizon for the other (the appropriator) class, and without doing anything for by far the larger class—those who have dry lands but no water claim at all.

The appropriators of water have done just what the law permitted them to do. Some few appropriators of water for irrigation have built good works, prepared their lands properly for irrigation, and are really public benefactors—for they have brought health and plenty where formerly ague and poverty, or widespread desolation reigned. They have, as a class, however, set up extravagant claims to water, have done little to make these claims good, and now hold them to the detriment of the people at large, not being able to organize, and economize the waters themselves, and permitting no one else to do it, because they fear to have adverse claims grow up. I repeat, it is quite natural that this should have been done. In fact, it is the only way by which rights to water could be held at all, and we would all do it if we could. But I doubt the propriety of the State attempting to limit one class of interests—the riparian—which, to say the least, is represented by the majority of people in the State who have any direct interest at all in the matter—for the benefit exclusively of another class—a small minority of her citizens—whom she has already permitted to acquire valuable, or what would then be exceedingly valuable, privileges by appropriating the waters of her streams, without at the same time taking steps to insure to the class restricted the rights which she does accord them.

The riparian principle carried out upon the

English common law rule should not be maintained in California. She never can be a truly great agricultural State without irrigation, and she should set that dog-in-the-manger principle aside, for a system which will insure a respect of all rights as far as can be, and accomplish the greatest good to the greatest number, by the use of the water in irrigation, as far as it can be, after satisfying the just demands of riparian proprietors by some means economical of the water supply, and at such seasons as will not materially interfere with navigation interests.

### The Proposed Remedy.

You will see from this about what I would propose as the solution of the irrigation question, namely: That the State shall direct and control the diversion of waters from the streams; insist upon its economical use; see that riparian proprietors are supplied with water for stock and domestic purposes, at least, if they cannot all come in for a share of the water for irrigation; see that all lands naturally dependent upon a public source of supply get their share, as far as the supply will go, upon some reasonable terms; and see that sufficient water is left in navigable streams to satisfy the interests of commerce, at stated seasons, when most needed.

This the State can do by virtue of her police authority, and in my humble judgment she will be obliged to do it some day, and the sooner it is done the better for all concerned.

Before, however, she can exercise this authority, she must know definitely what interests she has to deal with—what water rights have accrued and what is the nature of them—and there must be some general State plan of organization under which irrigation is to be carried on. There can be no satisfactory regulation of rights altogether undefined, and no settled condition of affairs until the irrigation interest is placed on a good business footing by a definition of present rights and an organization for future operations.

Hence, I propose that the State shall:

First—By the passage of a law entitled "An act to define and regulate water rights;"

Institute proceedings to define for record the extent and nature of all existing water privileges.

Provide for a proper record of existing rights to water, and for the annual correction of the same to date.

Provide for the issue of water privileges in proportion to the supply of water in each stream, and designate by schedule the extent and order of each claim.

Supervise, in a general way, the distribution of water from the streams of natural sources of supply, to those holding water privileges.

Establish a definite standard of measure for water used for agricultural and mining purposes, and prescribe the form and dimensions of measuring apparatus to be employed in dealing out water under different circumstances.

Second—By the passage of a law entitled "An act to promote irrigation;"

Provide for the organization of irrigation districts, from time to time, according to natural division of the land, as near as may be, in each instance.

Provide for the internal self-government of each such district by the resident thereof.

Provide for the allotment of permanent water privileges to such districts.

Provide for the condemnation of private water rights for the public use, in case of rights acquired to waters from public streams for lands within such districts.

Provide for the adjustment of riparian rights in each instance where a water privilege is granted to a regularly-organized district, so that riparian proprietors will be insured sufficient water for domestic and stock purposes, the district be held liable for its share of the expense of meeting this obligation, and the State undertake the adjustment.

Provide for the protection of river navigation by regulating the diversion of water from navigable rivers and their tributaries, so that in some certain periods the waters may be used for irrigation, and some other periods they shall be allowed to flow in the streams for the benefit of commerce.

Provide for the total extinguishment of rights by condemnation, where unadjustable conflicts occur.

Carry on such observations as will detect the locality and cause of waste or loss of water in each instance; conduct experiments with a view of discovering the most economical means of distributing and using water in irrigation without material loss or waste.

Establish general regulations, from time to time, for the distribution of water in irrigation, which will prevent waste, insure good drainage, and guard against the unhealthy tendency of careless and vicious use of water in irrigation.

### Important Points.

In framing these laws it must be kept in view that the sources of water supply vary in character, and that the nature of rights vary not only with the sources, but in themselves also.

Thus we may have sources of water supply of the following kinds:

Public streams—The living waters of navigable, tributaries of navigable, and non-navigable; the waters stored at private expense and that stored at public expense.

Private streams—The living waters of such to the extent of private claims, and the waters stored at private expense, and those stored at public expense.

Natural springs—Having sources above all appropriation; having sources to be affected by higher appropriation.

Artificial wells—Artesian wells and pump wells.

Waste water from irrigation canals.

Waste water from irrigated fields.

Waste water from drainage of moist land.

Claims to water have grown up from: Simple appropriation and use; filing notice, and appropriation under the Mining laws; filing notices, and appropriations under the Codes; appropriations under the Desert Land law; obtaining privileges from County Water Commissioners; through Spanish pueblo privileges, by ownership of the course, and the natural source of supply; by ownership of the bed of the stream; by ownership of the bank of the stream; by the construction of private wells; by the storage of waste waters.

### What may be Expected.

It is not to be expected that any law or laws can be framed at once which will settle the many conflicts of interest that arise out of these diverse interests and conditions. Without doubt many questions must for all time go to the Courts. But it is certainly possible to put irrigation upon a far better basis than it is now, and at the same time give the Courts some better guide in the execution of their duty than they have now. Certainly, the whole question can be simplified in the manner I propose, and I must confess that after much thought I see no other way how it can be accomplished.

If the matter goes on as it is, it will result in settling the disputes between rival claimants in the monopoly of all good water privileges by a few individuals, who will have water to sell under claims acquired without regulation, in the waste of water by reason of works constructed without system and used without proper supervision, and in many instances in the production of unhealthy neighborhoods by unskilled and unrestricted use of water.

And in the settling of disputes between appropriators and riparian proprietors on all streams of short supply, the appropriator will probably go to the wall, and water which might be made, under a proper organization, to irrigate thousands of acres of land, will be allowed to waste in the dry sand beds of streams and the pools of swamps, to effect some little natural irrigation below, or water a few head of live stock.

The conflict between water appropriation for irrigation and the navigation interests of streams below, cannot be settled but by the intervention of State regulation as indicated.

### Effect of the Proposed Plan.

The plan which I have outlined contemplates:

State regulation of the public sources of supply, the streams, and of waters allotted to claimants from those sources.

District or private regulation, under general State laws, of the details of distribution from the canals to the irrigators.

State regulation of the use of water in irrigation—to the end that none be wasted.

State adjustment of conflicting rights by arbitration, as it were, when possible, or by condemnation where necessary and possible.

When this much has been accomplished there will then be a good basis of credit in irrigation property. Capital can be obtained for the construction of irrigation works, on the credit of a district, whenever it is known that there attaches to the lands thereof, from the State, a good and sufficient water right for their irrigation.

For instance, a district embracing 30,000 acres of land has a water right. The lands were worth, dry, five dollars per acre. It will cost \$10 per acre to completely irrigate them. The district says to capital, construct our works according to pre-arranged State plans and specifications. We, the district, taken as a whole, will pay for this in 50 annual installments, principal and interest, the money to be raised by taxation on the whole property of the district under the State law, and, at the end of 50 years, take the works off your hands. In the meantime, revenue for the maintenance and administration of the works, to be raised from the sale of water to actual irrigators, at prices within limits to be pre-arranged.

By this plan good works would be constructed cheaply. The capital becomes a contractor to build works. The State supervises their construction. The interests of the district are protected. Capital has a security because there is a good water right attached to the land, and the State is the arbiter between parties to the transaction, by her general law properly administered.

The working of the plan would not be an attack on any class of interests. The appropriators would have their rights definitely determined by a procedure in which they would be called upon to prove their claims according to the measurements and statistics of the State, made and collected by her Engineer Department. They would not be put to any considerable expense; they would be relieved in many instances from future litigation and expense by having the facts affecting their claims and all rival claims, made of record, definitely, at once, and there would be no impediment put in the way of continued acquirement of right to the use of water under moderate and wholesome regulations.

Riparian proprietors would be assured their privileges as far as possible, and would be protected from the effects of the unregulated appropriation which they now fear.

The people of the State would be benefited by an assurance on the part of the State, that the waters would be used to the best advantage for the greatest number of those requiring them.

I shall call the attention of the Legislature at the approaching session to this matter, and submit a more definite plan than here outlined, for the consideration of its members.

In conclusion, permit me to observe that, in my opinion, by effecting the object aimed at herein—the settling of water right disputes, the conservation and exusion of the water supply for irrigation—the State will have only done simple justice to its residents of the largest portion of her territory, and will have practically increased her wealth many fold.

## The Suro Tunnel.

### Renewed Interest in Connection with It.

The Suro tunnel is once more a matter of absorbing interest to a large number of the mines along this portion of the Comstock, and the subject of connections with it is agitating the mining people anew. The connection about to be made to the Jacket is the central point around which much of the above-mentioned interest centers.

The south head of the tunnel is now in Con. Imperial ground, at the distance to the Jacket shaft does not vary much from 1,200 ft. The Con. Imperial has 463 ft., the Challenge 90, the Confidence 130 and the Jacket to the shaft, as per survey, 600 ft. This will make a total of 1,283 ft. The header does not move squarely across timbers, but the Jacket will make its connection at least 80 ft. further north than where the survey point lies; hence the difference in the distance to run. This, with the distance Imperial, will bring the total to about 1,200 ft. on the line run.

From the point where the Jacket will connect with the south lateral branch of the tunnel, or at least the point where it was to connect by the survey, the lateral will bear still more strongly to the east in the direction of the Forman shaft. To carry it so far away from the line of the present pumping works of the Belcher that the nearest point of connection for that mine will be where the Jacket makes its connection. The Belcher is looking up this matter of connecting with the tunnel, and the chances are that for the purposes of enabling that mine to carry on the work of drainage economically until such time as it will be able to use the Forman shaft, in which it owns a large interest, it will make its connection through the Jacket, even though it has to raise the water to the required level itself. The flow of water from the Imperial and the mines of its group heavy, and it is not certain that even the double line of Jacket pumps below the tunnel belt could handle it all, and take, in addition, what flows to the Belcher Crown Point pumps. To make assurance doubly sure, very likely the Belcher will connect its main line, in which its pumps operate with the Jacket shaft, at or about the level of the south lateral of the tunnel, and send its water through the way. It could then double its line up to thal level and bid defiance to the heaviest flows of water from the lower levels.

It is on account of all these things that more than usual interest just now centers around the connection with the tunnel about to be made from the Jacket shaft. This work must be done before any further explorations can be made in any of the mines between the Belcher and Overman. The latter has connection with the Belcher, so that when that mine connects with the tunnel the Overman and Caledonia can be trained also into the tunnel through the Belcher and its connections, and this fact intensifies interest in the Jacket connection. The problem of ventilation has been well solved on to Comstock, and the water problem will be well worked out when connections have been made with the Suro tunnel as above outlined.—*Gold Hill News.*

THE COAL FIELDS OF FRESNO COUNTY.—It is plain that, at an early day, the dwellers on the plains, through the San Joaquin valley, will find it cheaper to use coal than wood for fuel. This state of affairs would exist now if the Southern Pacific road was finished through by Pacheco pass, as would tap the coal fields of Fresno county. Numerous veins of coal, of a quality equal to or not superior to that from Mount Diablo, permeate the hills south of the Panoche and east of the Vallecitos canyon. The completion of the road would place a large portion of this valley within a comparatively short distance of the coal fields, and would enable people to obtain it at all times, and at prices that would enable them to burn it in preference to wood.—*Fresno Expositor.*

THE GUAYMAS AND SONORA RAILROAD.—Rapid progress is being made on the road from Guaymas north to intercept the southern overland road. The citizens of Guaymas are very much in favor of the railroad and earnestly desire its completion, which is said will be on or about the 1st of May, 1881. Times in Guaymas have greatly improved and there is a great rush of American immigration, some remaining in these cities to establish business and many going into mining districts in the interior of the State. Mexico now extends a warm and hearty welcome to American immigration. The jealous feeling which has for years existed between the two republics has entirely died away.



## THE ENGINEER.

## First Principles.

There is such a harmony in science, its various departments are so closely connected and correlated, that the knowledge of first principles is not only a necessity, but, in fact, if properly understood, forms the means of an extensive and correct practical application. Without the understanding of the principles which underlie a science or practice, the most practical of men will enact or repeat the grossest blunders. Practice forms a not-to-be underrated means of teaching principle, but often requires a long experience, great practice and at all times good judgment to deduce principles, which an intelligent study of the theory of the science will convey to us in a short time and more satisfactory way. Practice should constitute the embodiment of known principles and the means of deducing new ones, at not, as is now often the case, a method of teaching or verifying old, well known principles which have long been accepted, and knowledge of which would have prevented a useless expenditure of time and money.

The greater portion, not the whole, of the work of finding the necessary strength of bridges can be reduced to an application of the principle of moments, and similarly the strength of the working parts of the steam engine is, to a great extent, an application of this same principle. The numerous failures of roofs of buildings are solely due to lack of knowledge of first principles. As a general thing the architect scorns the use of the formulae of mechanics, of which he is too often grossly ignorant. The "rule of thumb" is the favorite method adopted, and consequently when a roof is designed for a building of a form and so which has not come within his previous experience, or that of his immediate advisers, the proper additional and required strength or "the extra inch of timber" is guessed at in a slipshod manner, instead of being calculated, and the structure constructed fully able to successfully withstand the strain to which it is subjected.

"Accidents" like that of the Hippodrome and of the post-office, New York, where one might have justly expected that the best talent would have been secured, we owe to the fact that instead of applying the fundamental laws of mechanics to compute the required strength, the architect thought the roof was strong enough—a matter of guess-work and not of positive knowledge, as was within his power to have. The Tay bridge disaster was in the main due to the neglect of not considering the effect of the pressure of the wind. In the construction of the Hudson River tunnel, attention was not paid to the universal law that that portion of a structure which is not constantly used, and upon the strength of which the safety of the remainder of the structure and its occupants depends, should possess sufficient strength under the most adverse conditions possible. The principles of the conservation of energy are the basis of all our reasoning relative to the transformation of energy in various modes of motion, and without a knowledge of these principles we must inevitably fall into error, and endorse valueless schemes for realizing fabulous power. In ordinary discussion in technical journals, especially in communications, the general lack of the fundamental principles is being constantly exposed. We propose to enter this subject of first principles more thoroughly, and especially to present the views of some of our more prominent engineers upon the value of the knowledge of the first principles in particular, and more important branches of the engineering profession.

## Continental Railroads.

At the rate railway building is progressing and new projects are undertaken, says the *Iron Age*, this continent will not lack for means of transportation between the Atlantic and Pacific. To mention De Lesseps' canal and the rival one that is proposed to build through Nicaragua, and ignore Capt. Eads' ship railway, four lines of railway are built or building to connect the Atlantic slope with the Pacific. The Union and Central are the completed lines. The Southern has to have been ready Jan. 1st, but will hardly be finished before March 1st. The Northern Pacific has been put into the hands of a construction company to build, and is to be pushed to completion, while the details of the argument for the construction of the Canadian Pacific, which provides that it shall be completed before Jan. 1, 1891, are at hand. When these are all done, he who wishes to see the hi-trees can have a choice of routes. What the effect of the completion of these lines will be on the course of trade it will be impossible to tell, but he would be regarded as a wild enthusiast who should predict what will be, probably, a reality before many years. Albert Richardson in an article apostrophized New York and San Francisco as the cities that should yet contest for the commercial empire of the world. This may not be a prophecy with no realization.

**AUSTRALIAN GOLD.** Official statistics show that Australia has supplied England during the last five years with \$11,738,000 in gold coin and bullion.

## USEFUL INFORMATION.

## Remarkable Echoes.

In the sepulchre of Metella, the wife of Sulla, in the Roman campagna, there is an echo which repeats five times, in different keys, and will also give back with distinctness a hexameter line which requires two and a half seconds to utter it.

On the banks of the Naha, between Bingen and Coblenz, an echo repeats 17 times. The speaker may scarcely be heard and yet the responses are loud and distinct, sometimes appearing to approach, at other times to come from a great distance.

Echoes equally beautiful and romantic are to be heard in our own islands. In the Abercorn family at Paisley, when the door of the chapel is shut, the reverberations are equal to the sound of thunder. If a single note is breathed, the tone ascends gradually with a multitude of echoes, until it dies in soft and bewitching murmurs. In this chapel is interred Margery, the daughter of Bruce and the wife of William Wallace.

The echo at the Eagle's Nest, on the banks of Killarney, is renowned for its effective repetition of a huge call which seems to be repeated by a hundred instruments, until it gradually dies away in the air. At the report of a cannon the loudest thunders reverberate from the rock and die in seemingly endless peals along the distant mountains.

At the Castle of Simenetta, a nobleman's seat, about 20 miles from Milan, a surprising echo is produced between the two wings of the building. The report of a pistol is repeated by this echo 60 times; and Addison, who visited the place on a somewhat foggy day, when the air was unfavorable to the experiment, counted 56 repetitions. At first they were very quick, but the intervals were greater in proportion as the sound decayed. It is asserted that the sound of one musical instrument in this place resembles a great number playing in concert. This echo is occasioned by the existence of two parallel walls of considerable length, between which the wave of sound is reverberated from one to the other until it is entirely spent.

**A NEW LIQUID GLUE.**—To produce good glue size, dissolve in a copper pan heated by indirect steam, four and one-half to five lbs. of soda in 20 lbs. to 24 lbs. of boiling water; then add to it, stirring well at the time, 30 lbs. of powdered resin, keeping the whole continually boiling until the resin is perfectly dissolved. This soda-resin composition, dissolved in the proportion of one lb. of resin to 30 lbs. or 40 lbs. of water, is to be mixed well together with a glue solution, made by dissolving 10 lbs. of glue in about 30 lbs. to 40 lbs. of water; then boil up both solutions together for about 10 minutes, after which run it through a fine sieve or filter, and it is then ready for use. The best proportions for mixing the vegetable and animal size are for one and a half parts resin add one part glue.

**PRESERVATIONS OF WOOD.**—The method of preserving wood by the application of lime, as pursued by M. Stostal, is published in the French journals. He piles the planks in a tank, and puts over all a layer of quicklime, which is gradually slaked with water. Timber for mines requires about a week to be thoroughly impregnated, and other wood more or less time according to its thickness. The material acquires a remarkable degree of hardness on being subjected to this process, and it is alleged, will never rot. Beech wood had been prepared in this way for hammers and other tools for iron work, and it is said to become as hard as oak without parting with any of its elasticity or toughness, and to last much longer than when not thus prepared.

**NEW MATERIAL FOR BRICK.**—Blast-furnace slag, that most hopeless of all waste substances, is now utilized to a great extent. It is converted into sand, mixed with a certain proportion of siliceous lime, and manufactured into bricks which possess many advantages over the ordinary bricks of commerce. By reducing the slag to a fibrous condition a material is produced which is usefully employed as a non-conductor of heat in clothing steam pipes and boilers. It is used in the manufacture of glass bottles and glass railway sleepers. But the most recent invention in slag utilization is in the production of a pure, white cement of greater strength than the best Portland cement.

**PHOSPHORESCENT LAMP FOR MINERS.**—The latest and not the least promising application of luminous paint is in the production of a safety lamp for coal miners. It is said to give light enough for practical use, and it is obvious that, in containing no fire, it is absolutely free from risk. By this invention, in connection with compressed-air blasting, fire and the attendant danger of exploding fire damp might be ruled out and the most dangerous mines made comparatively safe.

**FROZEN POTATOES.**—When potatoes are frozen the amount of sugar they contain is doubled, the starch undergoing a corresponding diminution, while part of the protein passes from the coagulable into the soluble form. During the process of rotting the potato loses half its nitrogenous constituents and the whole of the sugar.

## Glass Cloth Made in Pittsburgh.

One of the chief characteristics of glass is brittleness. "As brittle as glass" is a comparison frequently made, but, notwithstanding this marked characteristic, glass is susceptible of being spun and woven into fabrics as perfect, delicate, durable and handsome as the finest silk. Glass has been spun and woven in Austria for a number of years, but not until recently has this feat been attempted in the United States. A prominent Pittsburgh glass manufacturing firm, Messrs. Atterbury & Co., says the *American Manufacturer*, have provided themselves with facilities for producing various kinds of fabrics from this ordinarily brittle substance, some of which they have already made. Among the articles they are prepared to exhibit are a napkin, a towel and tablecloth. The latter is about six ft. square, and white in color, except the ends and sides, which are a delicate green, and the four edges are fringed. The towel and napkin are the same as the tablecloth, except the ornamental border, which in one is red and in the other pink. These fabrics are as flexible and but slightly heavier than those woven of flax, and the manufacturers state that they can be washed and ironed, like the ordinary tablecloths and napkins. Besides these articles the firm have a number of large feathers made by them, which are fashioned of variously colored threads of glass, the base being a piece of brass wire. These feathers resemble ostrich feathers, and are wondrously beautiful in shape and color. These good Messrs. Atterbury & Co. will place on the market just as soon as there is a demand for them.

The firm can spin 250 of these fine threads, each ten miles in length, in one minute, the process being much more interesting than the spinning of cotton or other threads by the usual methods. The weaving is done with an ordinary loom, some of the machinery of which the firm have adapted to the requirements of the manufacture. The fabric cannot be ripped or torn, and can be sold at a less price than cotton, silk, or whatever other fabric imitated. The firm state that the cloth, whether coarse or fine, when worn as a dress or shawl, or other garment, will be just as warm, easy-fitting and comfortable every way as clothing of any other kind.

The firm are now fully prepared to receive orders for glass garments of any description.

**CEMENT FOR UNITING LEATHER AND METAL.** Wash the metal with hot gelatine; steep the leather in an infusion of nutgalls (hot) and bring the two together.

## GOOD HEALTH.

## Pertinent Facts About Eating.

In a recent number of the *London Standard* under the query, "Do we eat too much?" the writer gives many interesting facts. He says, for instance, that the amount of nourishment which a person needs greatly depends on his constitution, state of health, habits and work. A sedentary man requires less than one whose duties demand the exercise of his muscles, and a brain-worker needs more than an idler. But unquestionably the majority of us take more than we need. Indeed, food and work are distributed most unequally. The man of leisure is also the man of means, and accordingly fares sumptuously every day; while the laborer toils for eight hours and finds it difficult to get enough to repair the waste of his tissues. Yet a Chinaman or a Bengalee will toil under a tropical sun, and find a few pieces of rice or jowhar sufficient to sustain his strength. A Frenchman will not eat half what an Englishman engaged in the same work will demand, and a Spanish laborer, content in ordinary times with a watermelon and a bit of black bread, will toil in the vineyard and grow fat on a dietary of onion porridge and grapes.

It is true that Mr. Brassey, when building the Continental railway, found that one English navy was worth a couple of spare-fed foreigners. But, on the other hand, the British-Columbian and Californian gold-diggers, than whom a more magnificent set of athletes does not exist, live in the remote mountains of the far West mainly on beans flavored with a few cubes of pork. But they also obtain the best of water and the purest of air, and their outdoor life and active exercise enable them to digest every ounce of their frugal fare. The English soldiers, though better fed than those of any army except the American, do not get one-half the solid nutriment which the idliest of club-loungers considers indispensable for his sustenance. An athlete in training is allowed even less food; yet he prospers on the limited fare, and prolongs his life by the regimen by which he has been subjected.

King Victor Emmanuel was a monarch of the most robust physique; yet he only ate one meal per day, and it is manifestly absurd for any man to require three more or less weighty meals, and an afternoon cup of tea, to support the exertion of walking to the club, riding an hour in the park, writing a note or two and dancing a couple of miles around a ball room. The audience had their "amethysts," or "sober stones" by which they regulated their indulgence at table. The moderns have not even this. But they have their gont and their livers to warn them, when it is too late, that nature has been overtaken.

## The Air We Breathe.

It is composed of one part of oxygen and four parts nitrogen. The former supports life, the latter extinguishes it. The more oxygen there is, the livelier, the healthier and the more joyful are we; the more nitrogen, the more sleepy and stupid and dull we become. But if all the air were oxygen, the first lighted match would wrap the world in instant flame; if all were nitrogen, the next instant there would not be upon the populated globe a single living creature. When oxygen was discovered by Priestley, nearly 80 years ago, there was great jubilation among doctors and chemists. The argument was plausible, and seemed perfectly convincing: "If oxygen is the life and health of the atmosphere, as we have found out how to make oxygen, we have only to increase the quantity in the air we breathe, in order to wake up new life, to give health to the diseased, and youth to the aged." But, on trial, it was found that it made a man a maniac or a fool, and if continued, a corpse. Various other experiments have been made to improve upon the handiwork of the Allwise Maker of the Universe, but they have been successive failures, and thinking men have long since come to the conclusion that, as there can be no improvement upon the cold water of the first creation in slaking thirst, so there can be no addition made to pure air which will better answer its life-sustaining purposes. And as there is not, in all nature, a still, warm atmosphere that does not instantly begin to degenerate decay, corruption and death, so there is no chamber of the sick, graduated to a degree, that will not hasten the end desired to be averted.

**HIPPOTRAPHY IN FRANCE.**—Some very interesting statistics have been published by the society for promoting the use of horse flesh and the flesh of asses and mules as food, showing how steadily the consumption of these articles of diet has been increasing in Paris and the provinces since the foundation of the society in 1866. The weight has increased from 171,300 lbs. in 1866 to 1,982,620 lbs. in 1879. In the principal cities of the provinces the consumption of horse-flesh may be considered to have fairly taken root. At Marseilles, in 1870, there were 599 horses eaten, 1,031 in 1875, and 1,533 in 1878. At Nancy, 165 in 1873, over 350 in 1876, and 705 in 1878; at Rheims, 291 in 1874, 423 in 1876 and 384 in 1878; at Lyons, 1,839 in 1873 and 1,313 in 1875. In both the latter cases some difficulties had been thrown in the way by the town authorities, as was the case recently at Chalons-sur-Marne, where the Mayor fixed the price of the horse-flesh at a higher rate than that of beef. The average price of horse meat is from 25 to 30 cents per lb. Each horse furnishes about 200 kilogrammes (four cwt.) of meat, which is capable of being prepared in many by no means unappetizing ways, such as *pot-au-feu*, boiled, roasted, hashed, haricot, juggled fillet, etc.

**TOO MUCH CIGARETTE.**—There is too much cigarette. The small boy has got it into his mouth, and it is using him up. The Philadelphia *Times* says physicians and other people in that city are pained by the spectacle, growing more common every day, of pale-faced lads, ranging in age from 6 to 20 years, who are puffing their little lives away in smoking. Day and night they throng the streets, where the peculiar offensive odor generated by cigarettes made of cheap paper and bad tobacco renders their smoking as obnoxious to others as it is hurtful to themselves. Every evening before the doors of the theaters they raise a cloud of foul smoke that is equally injurious to their own rickety constitutions and to the noses of their victims. Doubtless, also, they carry their pernicious habit into their homes—when they are old enough to do so without risk of the spanking that they deserve—thus still further doing harm to themselves and making other people uncomfortable.

**PHENOMENAL EXUDATION OF BLOOD.**—The Chicago *Daily News* of Dec. 20th, says: The doctors are puzzled and interested by a peculiar case on the west side. A 14-year-old son of Wm. Crawford, captain of a tug boat, has for some years been sweating blood at times, and lately has had severe attacks which alarmed his parents. His infirmity comes on him usually after taking cold. Great black patches appear on his body, from which blood drops, the size of a pinhead, exude. Blood flows from his mouth, nose, ears, stomach, and even from his bladder and kidneys. No pain accompanies these discharges, but they make his blood thin, and weaken him. Sudden fright or excitement will easily check the flow. He is mentally bright, and his father, mother, brothers and sisters are strong and healthy. The physicians who have taken an interest in his case, propose sending him to Edinburgh and London, for examination by the Academy of Surgeons.

**CURE FOR DANDRUFF.**—Mr. John L. Davis, in the *Journal of Pharmacy*, asserts (having fully tested it in his own case), that a preparation of one ounce of sulphur and one quart of water, repeatedly agitated during intervals of a few hours, and the head saturated every morning with the clear liquid, will, in a few weeks, remove every trace of dandruff from the scalp, and the hair will become soft and glossy. He says: "I do not pretend to explain the *modus operandi* of the treatment, for it is well known that sublimed sulphur is almost or wholly insoluble, and the liquid used was destitute of taste, color or smell. The effect speaks for itself."



## Irrigation and Water Rights.

State Engineer W. H. Hall, has made to the Governor the following supplemental report on the water question in California:

Conflicts of interest, for whose adjustment the present laws afford no adequate method, keep matters connected with water rights for irrigation in such an unsettled condition that there is no basis of credit upon which to raise money for the construction of irrigation works, and no certainty in farming with irrigation, except in cases where all rights can be monopolized or brought under one control, and these instances are few.

Two general classes of conflicts have made themselves known throughout the counties where irrigation is now practiced, namely:

Conflicts between rival appropriators of water, or claimants by prescription; and,

Conflicts between appropriators, or claimants by prescription, and riparian owners.

Of course there are an infinite number of sub-varieties of cases which come up under each of the general classes.

In the San Joaquin valley, not only are these conflicting interests present, but another element will soon make its appearance (indeed it has already), and we will have inevitably, unless the State controls and directs the diversion of waters from the San Joaquin river and its tributaries.

The worst conflict of all, namely: that between the appropriators of waters for irrigation, and the navigation interests on the main river.

### Proposed Settlement of Conflicts.

The question is, how to do away with this clashing of interests.

To settle conflicts between appropriators or claimants by prescription, it has been proposed—and I find the plan advocated by many worthy people in the irrigation regions—that the State take charge of this whole matter of irrigation—condemn and pay for all existing rights to water, for the public benefit, construct the works of irrigation, and sell the water.

As a variation to this, others advocate an appropriation of the waters, after being condemned for the public good, and paid for by the State, to the lands requiring them.

And again, other people would have all water rights condemned, but paid for by the lands to be benefited in each instance.

I do not think any such plan is feasible, and for the following reasons:

First—The outlay for the satisfaction of existing water claims would necessarily be so great that the State could not be brought to undertake the settlement.

Second—If the State should undertake the construction of irrigation canals, or works of irrigation proper, her enterprise would fail of success, and involve her in enormous expenditures of money.

(See Chapter V, of Part IV, Report of State Engineer, January, 1880.)

Third—If the State should reapportion the waters, the supply would not be sufficient for all, and the conflict would be as great as ever.

Fourth—The conflict between users of water for irrigation and claimants under the riparian principle would still exist, and could not be done away with by condemnation—for the field is immeasurably too great.

Fifth—The conflict between users of water for irrigation and the navigation interests would still exist, and it is altogether impracticable to condemn the right of navigating a public stream.

### Riparians vs. Appropriators.

It has been proposed to limit the rights of riparian proprietors to water privileges for the use of stock and domestic purposes. While I heartily concur in this as a correct—in fact, the only admissible—definition of a riparian right in an irrigation country, I see very clearly how the State, by making this simple declaration and doing no more, will strike a blow at one (the riparian) class of interests, without clearing up the horizon for the other (the appropriation) class, and without doing anything for by far the larger class—those who have dry lands but no water claim at all.

The appropriators of water have done just what the law permitted them to do. Some few appropriators of water for irrigation have built good works, prepared their lands properly for irrigation, and are really public benefactors—for they have brought health and plenty where formerly egue and poverty, or widespread desolation reigned. They have, as a class, however, set up extravagant claims to water, have done little to make these claims good, and now hold them to the detriment of the people at large, not being able to organize, and economize the waters themselves, and permitting no one else to do it, because they fear to have adverse claims grow up. I repeat, it is quite natural that this should have been done. In fact, it is the only way by which rights to water could be held at all, and we would all do it if we could. But I doubt the propriety of the State attempting to limit one class of interests—the riparian—which, to say the least, is represented by the majority of people in the State who have any direct interest at all in the matter—for the benefit exclusively of another class—a small minority of her citizens—whom she has already permitted to acquire valuable, or what would then be exceedingly valuable, privilege by appropriating the waters of her streams, without at the same time taking steps to insure to the class restricted the rights which she does accord them.

The riparian principle carried out upon the

English common law rule should not be maintained in California. She never can be a truly great agricultural State without irrigation, and she should set that dog-in-the-manger principle aside, for a system which will insure a respect of all rights as far as can be, and accomplish the greatest good to the greatest number, by the use of the water in irrigation, as far as it can be, after satisfying the just demands of riparian proprietors by some means economical of the water supply, and at such seasons as will not materially interfere with navigation interests.

### The Proposed Remedy.

You will see from this about what I would propose as the solution of the irrigation question, namely: That the State shall direct and control the diversion of waters from the streams; insist upon its economical use; see that riparian proprietors are supplied with water for stock and domestic purposes, at least, if they cannot all come in for a share of the water for irrigation; see that all lands naturally dependent upon a public source of supply get their share, as far as this supply will go, upon some reasonable terms; and see that sufficient water is left in navigable streams to satisfy the interests of commerce, at stated seasons, when most needed.

This the State can do by virtue of her police authority, and in my humble judgment she will be obliged to do it some day, and the sooner it is done the better for all concerned.

Before, however, she can exercise this authority, she must know definitely what interests she has to deal with—what water rights have accrued and what is the nature of them—and there must be some general State plan of organization under which irrigation is to be carried on. There can be no satisfactory regulation of rights altogether undefined, and no settled condition of affairs until the irrigation interest is placed on a good business footing by a definition of present rights and an organization for future operations.

Hence, I propose that the State shall:

First—By the passage of a law entitled "An act to define and regulate water rights."

Institute proceedings to define for record the extent and nature of all existing water privileges.

Provide for a proper record of existing rights to water, and for the annual correction of the same to date.

Provide for the issue of water privileges in proportion to the supply of water in each stream, and designate by schedule the extent and order of each claim.

Supervise, in a general way, the distribution of water from the streams of natural sources of supply, to those holding water privileges.

Establish a definite standard of measure for water used for agricultural and mining purposes, and prescribe the form and dimensions of measuring apparatus to be employed in dealing out water under different circumstances.

Second—By the passage of a law entitled "An act to promote irrigation."

Provide for the organization of irrigation districts, from time to time, according to natural division of the land, as near as may be, in each instance.

Provide for the internal self-government of each such district by the resident thereof.

Provide for the allotment of permanent water privileges to such districts.

Provide for the condemnation of private water rights for the public use, in case of rights acquired to waters from public streams for lands within such districts.

Provide for the adjustment of riparian rights in each instance where a water privilege is granted to a regularly-organized district, so that riparian proprietors will be insured sufficient water for domestic and stock purposes, the district be held liable for its share of the expense of meeting this obligation, and the State undertake the adjustment.

Provide for the protection of river navigation by regulating the diversion of water from navigable rivers and their tributaries, so that in some certain periods the waters may be used for irrigation, and some other periods they shall be allowed to flow in the streams for the benefit of commerce.

Provide for the total extinguishment of rights by condemnation, where unadjustable conflicts occur.

Carry on such observations as will detect the locality and cause of waste or loss of water in each instance; conduct experiments with a view of discovering the most economical means of distributing and using water in irrigation without material loss or waste.

Establish general regulations, from time to time, for the distribution of water in irrigation, which will prevent waste, insure good drainage, and guard against the unhealthy tendency of careless and vicious use of water in irrigation.

### Important Points.

In framing these laws it must be kept in view that the sources of water supply vary in character, and that the nature of rights vary not only with the sources, but in themselves also.

Thus we may have sources of water supply of the following kinds:

Public streams—The living waters of navigable, tributaries of navigable, and non-navigable; the waters stored at private expense and that stored at public expense.

Private streams—The living waters of each to the extent of private claims, and the waters stored at private expense, and those stored at public expense.

Natural springs—Having sources above all appropriation; having sources to be affected by higher appropriation.

Artificial wells—Artesian wells and pump wells.

Waste water from irrigation canals.

Waste water from irrigated fields.

Waste water from drainage of moist land.

Claims to water have grown up from: Simple appropriation and use; filing notice, and appropriation under the Mining laws; filing notices, and appropriations under the Codes; appropriations under the Deert Land law; obtaining privileges from County Water Commissioners; through Spanish pueblo privileges, by ownership of the course, and the natural source of supply; by ownership of the bed of the stream; by ownership of the bank of the stream; by the construction of private wells; by the storage of waste waters.

### What may be Expected.

It is not to be expected that any law or laws can be framed at once which will settle the many conflicts of interest that arise out of these diverse interests and conditions. Without doubt many questions must for all time go to the Courts. But it is certainly possible to put irrigation upon a far better basis than it is now, and at the same time give the Courts some better guide in the execution of their duty than they have now. Certainly, the whole question can be simplified in the manner I propose, and I must confess that after much thought I see no other way how it can be accomplished.

If the matter goes on as it is, it will result in settling the disputes between rival claimants in the monopoly of all good water privileges by a few individuals, who will have water to sell under claims acquired without regulation, in the waste of water by reason of works constructed without system and used without proper supervision, and in many instances in the production of unhealthy neighborhoods by unskilled and unrestricted use of water.

And in the settling of disputes between appropriators and riparian proprietors on all streams of short supply, the appropriator will probably go to the wall, and water which might be made, under a proper organization, to irrigate thousands of acres of land, will be allowed to waste in the dry sand beds of streams and the pools of swamps, to effect some little natural irrigation below, or water a few head of live stock.

The conflict between water appropriation for irrigation and the navigation interests of streams below, cannot be settled but by the intervention of State regulation as indicated.

### Effect of the Proposed Plan.

The plan which I have outlined contemplates:

State regulation of the public sources of supply, the streams, and of waters allotted to claimants from those sources.

District or private regulation, under general State laws, of the details of distribution from the canals to the irrigators.

State regulation of the use of water in irrigation—to the end that none be wasted.

State adjustment of conflicting rights by arbitration, as it were, when possible, or by condemnation where necessary and possible.

When this much has been accomplished there will then be a good basis of credit in irrigation property. Capital can be obtained for the construction of irrigation works, on the credit of a district, whenever it is known that there attaches to the lands thereof, from the State, a good and sufficient water right for their irrigation.

For instance, a district embracing 30,000 acres of land has a water right. The lands were worth, dry, five dollars per acre. It will cost \$10 per acre to completely irrigate them. The district says to capital, construct our works according to pre-arranged State plans and specifications. We, the district, taken as a whole, will pay for this in 50 annual installments, principal and interest, the money to be raised by taxation on the whole property of the district under the State law, and, at the end of 50 years, take the works off your hands. In the meantime, revenue for the maintenance and administration of the works, to be raised from the sale of water to actual irrigators, at prices within limits to be pre-arranged.

By this plan good works would be constructed cheaply. The capital becomes a contractor to build works. The State supervises their construction. The interests of the district are protected. Capital has a security because there is a good water right attached to the land, and the State is the arbiter between parties to the transaction, by her general law properly administered.

The working of the plan would not be an attack on any class of interests. The appropriators would have their rights definitely determined by a procedure in which they would be called upon to prove their claims according to the measurements and statistics of the State, made and collected by her Engineer Department. They would not be put to any considerable expense; they would be relieved in many instances from future litigation and expense by having the facts affecting their claims and all rival claims, made of record, definitely, at once, and there would be no impediment put in the way of continued acquirement of right to the use of water under moderate and wholesome regulations.

Riparian proprietors would be assured their privileges as far as possible, and would be protected from the effects of the unregulated appropriation which they now fear.

The people of the State would be benefited by an assurance on this part of the State, that the water would be used to the best advantage for the greatest number of those requiring them.

I shall call the attention of the Legislature at the approaching session to this matter, and submit a more definite plan than here outlined, for the consideration of its members.

In conclusion, permit me to observe that, in my opinion, by effecting the object aimed at herein—the settling of water right disputes, the conservation and extension of the water supply for irrigation—the State will have only done simple justice to the residents of the largest portion of her territory, and will have practically increased her wealth many fold.

## The Sutro Tunnel.

### Renewed Interest in Connection with It.

The Sutro tunnel is once more a matter of absorbing interest to a large number of the mine along this portion of the Comstock, and the subject of connections with it is agitating the mining populace anew. The connection about to be made by the Jacket is the central point around which much of the above-mentioned interest centers.

The south header of the tunnel is now in Con. Imperial ground, and the distance to the Jacket shaft does not vary much from 1,200 ft. The Con. Imperial has 463 ft., the Challenge 90, the Confidence 130, and the Jacket to the shaft, as per survey, 600 ft. This will make a total of 1,283 ft. The header does not move squarely across the mines, but the Jacket will make its connection at least 80 ft. further north than where the survey point lies; hence the difference in the distance to run. This, with the distance in Imperial, will bring the total to about 1,200 ft. on the line run.

From the point where the Jacket will connect with the south lateral branch of the tunnel, or at least the point where it was to connect by this survey, that lateral will bear still more strongly to the east in the direction of the Forman shaft. This will carry it so far away from the line of the present pumping works of the Belcher that the nearest point of connection for that mine will be where the Jacket makes its connection. The Belcher is looking up this matter of connecting with the tunnel, and the chances are that for the purposes of enabling that mine to carry on the work of drainage economically until such time as it will be able to use the Forman shaft, in which it owns a large interest, it will make its connection through the Jacket, even though it has to raise the water to the required level itself. The flow of water from the Imperial and the mines of its group is heavy, and it is not certain that even the double line of Jacket pumps below the tunnel level could handle it all, and take, in addition, what flows to the Belcher-Crown Point pumps. To make assurance doubly sure, very likely the Belcher will connect its main incline, in which its pumps operate with the Jacket shaft, at or about the level of the south lateral of this tunnel, and send its water through that way. It could then double its line up to that level and bid defiance to the heaviest flows of water from the lower levels.

It is on account of all these things that more than usual interest just now centers around the connection with the tunnel about to be made from the Jacket shaft. This work must be done before any further explorations can be made in any of the mines between the Bulion and Overman. The latter has connection with the Belcher, too, so that when that mine connects with the tunnel the Overman and Caledonia can be drained also into the tunnel through the Belcher and its connections, and this fact intensifies interest in the Jacket connection. The problem of ventilation has been well solved on the Comstock, and the water problem will be well worked out when connections have been made with the Sutro tunnel as above outlined.—*Gold Hill News*.

**THE COAL FIELDS OF FRESNO COUNTY.**—It is plain that, at an early day, the dwellers on the plains, through the San Joaquin valley, will find it cheaper to use coal than wood for fuel. This state of affairs would exist now if the Southern Pacific road was finished through by Pacheco pass, as it would tap the coal fields of Fresno county. Numerous veins of coal, of a quality equal to if not superior to that from Mount Diablo, permeate the hills south of the Panoche and east of the Vallecitos canyon. The completion of this road would place a large portion of this valley within a comparatively short distance of the coal fields, and would enable people to obtain coal at all times, and at prices that would enable them to burn it in preference to wood.—*Fresno Examiner*.

**THE GUAYMAS AND SONORA RAILROAD.**—Rapid progress is being made on the road from Guaymas north to intercept the southern overland road. The citizens of Guaymas are very much in favor of the railroad and earnestly desire its completion, which is said will be on or about the 1st of May, 1881. Times in Guaymas have greatly improved and there is a great rush of American immigration, some remaining in these cities to establish business and many going into mining districts in the interior of the State. Mexico now extends a warm and hearty welcome to American immigration. The jealous feeling which has for many years existed between the two republics has entirely died away.



## THE ENGINEER.

## First Principles.

There is such a harmony in science, its various departments are so closely connected and correlated, that the knowledge of first principles is not only a necessity, but, in fact, if properly understood, forms the means of an extensive and correct practical application. Without the understanding of the principles which underlie a science or practice, the most practical of men will enact or repeat the grossest blunders. Practice forms a not-to-be underrated means of teaching principle, but it often requires a long experience, great practice and at all times good judgment to deduce principles, which an intelligent study of the theory of the science will convey to us in a shorter time and more satisfactory way. Practice should constitute the embodiment of known principles and the means of deducing new ones, but not, as is now often the case, a method of teaching or verifying old, well known principles, which have long been accepted, and knowledge of which would have prevented a needless expenditure of time and money.

The greater portion, if not the whole, of the work of finding the necessary strength of bridges can be reduced to an application of the principle of moments, and similarly the strength of the working parts of the steam engine is, to a great extent, an application of this same principle. The numerous failures of roofs of buildings are solely due to a lack of knowledge of first principles. As a general thing the architect scorns the use of the formulae of mechanics, of which he is too often grossly ignorant. The "rule of thumb" is the favorite method adopted, and consequently when a roof is designed for a building of a form and size which has not come within his previous experience, or that of his immediate advisers, the proper additional and required strength or "the extra inch of timber" is guessed at in a slipshod manner, instead of being calculated, and a truss constructed fully able to successfully withstand the strain to which it is subjected.

"Accidents" like that of the Hippodrome and of the post-office, New York, where one might have justly expected that the best talent would have been secured, were due to the fact that instead of applying the fundamental laws of mechanics to compute the required strength, the architect thought the roof was strong enough—a matter of guess-work and not of positive knowledge, as was within his power to have. The Tay bridge disaster was in the main due to the neglect of not considering the effect of the pressure of the wind. In the construction of the Hudson River tunnel, attention was not paid to the universal law that that portion of a structure which is most constantly used, and upon the strength of which the safety of the remainder of the structure and its occupants depends, should possess sufficient strength under the most adverse conditions possible. The principles of the conservation of energy are the basis of all our reasoning relative to the transformation of energy in various modes of motion, and without a knowledge of these principles we must inevitably fall into error, and endorse valueless schemes for realizing fabulous power. In ordinary discussions in technical journals, especially in communications, the general lack of the fundamental principles is being constantly exposed. We propose to enter this subject of first principles more thoroughly, and especially to present the views of some of our more prominent engineers upon the value of the knowledge of the first principles in particular, and more important branches of the engineering profession.

## Continental Railroads.

At the rate railway building is progressing and new projects are undertaken, says the *Iron Age*, this continent will not lack for means of transportation between the Atlantic and Pacific. Not to mention De Lesseps' canal and the rival one that is proposed to build through Nicaragua, and ignoring Capt. Eads' ship railway, four lines of railway are built or building to connect the Atlantic slope with the Pacific. The Union and Central are the completed lines. The Southern was to have been ready Jan. 1st, but will hardly be finished before March 1st. The Northern Pacific has been put into the hands of a construction company to build, and is to be pushed to completion, while the details of the agreement for the construction of the Canadian Pacific, which provides that it shall be completed before Jan. 1, 1891, are at hand. When these are all done, he who wishes to see the big trees can have a choice of routes. What the effect of the completion of these lines will be on the course of trade it will be impossible to tell, but he would be regarded as a wild enthusiast who should predict what will be, probably, a reality hereafter many years. Albert Richardson in an article apostrophized New York and San Francisco as the two cities that should yet contest for the commercial empire of the world. This may not be all prophecy with no realization.

AUSTRALIAN GOLD.—Official statistics show that Australia has supplied England during the last five years with \$131,738,000 in gold coin and bullion.

## USEFUL INFORMATION.

## Remarkable Echoes.

In the sepulchre of Metella, the wife of Sulla, in the Roman campagna, there is an echo which repeats five times, in different keys, and will also give back with distinctness a hexameter line which requires two and a half seconds to utter it.

On the banks of the Naha, between Bignon and Coblenz, an echo repeats 17 times. The speaker may scarcely be heard and yet the response is loud and distinct, sometimes appearing to approach, at other times to come from a great distance.

Echoes equally beautiful and romantic are to be heard in our own islands. In the Abercorn family at Paisley, when the door of the chapel is shut, the reverberations are equal to the sound of thunder. If a single note is breathed, the tone ascends gradually with a multitude of echoes, until it dies in soft and hewitching murmurs. In this chapel is interred Margery, the daughter of Bruce and the wife of William Wallace.

The echo at the Eagle's Nest, on the banks of Killarney, is renowned for its effective repetition of a huckle which seems to be repeated by a hundred instruments, until it gradually dies away in the air. At the report of a cannon the loudest thunders reverberate from the rock and die in seemingly endless peals along the distant mountains.

At the Castle of Simenetta, a nobleman's seat, about 20 miles from Milan, a surprising echo is produced between the two wings of the building. The report of a pistol is repeated by this echo 60 times; and Addison, who visited the place on a somewhat foggy day, when the air was unfavorable to the experiment, counted 56 repetitions. At first they were very quick, but the intervals were greater in proportion as the sound decayed. It is asserted that the sound of one musical instrument in this place resembles a great number playing in concert. This echo is occasioned by the existence of two parallel walls of considerable length, between which the wave of sound is reverberated from one to the other until it is entirely spent.

A NEW LIQUID GLUE.—To produce good glue size, dissolve in a copper pan heated by indirect steam, four and one-half to five lbs. of soda in 20 lbs. to 24 lbs. of boiling water; then add to it, stirring well at the time, 30 lbs. of powdered resin, keeping the whole continually boiling until the resin is perfectly dissolved. This soda-resin composition, dissolved in the proportion of one lb. of resin to 30 lbs. or 40 lbs. of water, is to be mixed well together with a glue solution, made by dissolving 10 lbs. of glue in about 30 lbs. to 40 lbs. of water; then boil up both solutions together for about 10 minutes, after which run it through a fine sieve or filter, and it is then ready for use. The best proportions for mixing the vegetable and animal size are for one and a half parts resin add one part glue.

PRESERVATIONS OF WOOD.—The method of preserving wood by the application of lime, as pursued by M. Svostal, is published in the French journals. He piles the planks in a tank, and puts over all a layer of quicklime, which is gradually slaked with water. Timber for mines requires about a week to be thoroughly impregnated, and other wood more or less time according to its thickness. The material acquires a remarkable degree of hardness on being subjected to this process, and, it is alleged, will never rot. Beech wood had been prepared in this way for hammers and other tools for iron works, and it is said to become as hard as oak without parting with any of its elasticity or toughness, and to last much longer than when not thus prepared.

NEW MATERIAL FOR BRICK.—Blast-furnace slag, that most hopeless of all waste substances, is now utilized to a great extent. It is converted into sand, mixed with a certain proportion of siliceous lime, and manufactured into bricks which possess many advantages over the ordinary bricks of commerce. By reducing the slag to a fibrous condition a material is produced which is usefully employed as a non-conductor of heat in clothing steam pipes and boilers. It is used in the manufacture of glass bottles and glass railway sleepers. But the most recent invention in slag utilization is in the production of a pure, white cement of greater strength than the best Portland cement.

PHOSPHORESCENT LAMP FOR MINERS.—The latest and not the least promising application of luminous paint is in the production of a safety lamp for coal miners. It is said to give light enough for practical use, and it is obvious that, in containing no fire, it is absolutely free from risk. By this invention, in connection with compressed-air blasting, fire and the attendant danger of exploding fire damp might be ruled out and the most dangerous mines made comparatively safe.

FROZEN POTATOES.—When potatoes are frozen the amount of sugar they contain is doubled, the starch undergoing a corresponding diminution, while part of the protein passes from the coagulable into the soluble form. During the process of rotting the potato loses half its nitrogenous constituents and the whole of the sugar.

## Glass Cloth Made in Pittsburg.

One of the chief characteristics of glass is brittleness. "As brittle as glass" is a comparison frequently made, but, notwithstanding this marked characteristic, glass is susceptible of being spun and woven into fabrics as perfect, delicate, durable and handsome as the finest silk. Glass has been spun and woven in Austria for a number of years, but not until recently has this feat been attempted in the United States. A prominent Pittsburg glass manufacturing firm, Messrs. Atterbury & Co., saye the *American Manufacturer*, have provided themselves with facilities for producing various kinds of fabrics from this ordinarily brittle substance, some of which they have already made. Among the articles they are prepared to exhibit are a napkin, a towel and tablecloth. The latter is about six ft. square, and white in color, except the ends and sides, which are a delicate green, and the four edges are fringed. The towel and napkin are the same as the tablecloth, except the ornamental border, which in one is red and in the other pink. These fabrics are as flexible and but slightly heavier than those woven of flax, and the manufacturers state that they can be washed and ironed, like the ordinary tablecloths and napkins. Besides these articles the firm have a number of large feathers made by them, which are fashioned of variously colored threads of glass, the base being a piece of brass wire. These feathers resemble ostrich feathers, and are wonderfully beautiful in shape and color. These goods Messrs. Atterbury & Co. will place on the market just as soon as there is a demand for them.

The firm can spin 250 of these fine threads, each ten miles in length, in one minute, the process being much more interesting than the spinning of cotton or other threads by the usual methods. The weaving is done with an ordinary loom, some of the machinery of which the firm have adapted to the requirements of the manufacture. The fabric cannot be ripped or torn, and can be sold at a less price than cotton, silk, or whatever other fabric imitated. The firm state that the cloth, whether coarse or fine, when worn as a dress or shawl, or other garment, will be just as warm, easy-fitting and comfortable every way as clothing of any other kind.

The firm are now fully prepared to receive orders for glass garments of any description.

CEMENT FOR UNITING LEATHER AND METAL. Wash the metal with hot gelatin; steep the leather in an infusion of nutgalls (hot) and bring the two together.

## GOOD HEALTH.

## Pertinent Facts About Eating.

In a recent number of the London *Standard* under the query, "Do we eat too much?" the writer gives many interesting facts. He says, for instance, that the amount of nourishment which a person needs greatly depends on his constitution, state of health, habits and work. A sedentary man requires less than one whose duties demand the exercise of his muscles, and a brain-worker needs more than an idler. But unquestionably the majority of us take more than we need. Indeed, food and work are distributed most unequally. The man of leisure is also the man of means, and accordingly fares sumptuously every day; while the laborer toils for eight hours and finds it difficult to get enough to repair the waste of his tissues. Yet a Chinaman or a Bengalee will toil under a tropical sun, and find a few pice worth of rice or jowar sufficient to sustain his strength. A Frenchman will not eat half what an Englishman engaged in the same work will demand, and a Spanish laborer, content in ordinary times with a watermelon and a bit of black bread, will toil in the vineyards and grow fat on a dietary of onion porridge and grapes.

It is true that Mr. Brasey, when building the Continental railway, found that one English navy was worth a couple of spare-fed foreigners. But, on the other hand, the British-Columbian and Californian gold-diggers, than whom a more magnificent set of athletes does not exist, live in the remote mountains of the far West mainly on beans flavored with a few cubes of pork. But they also obtain the best of water and the purest of air, and their outdoor life and active exercise enable them to digest every ounce of their frugal fare. The English soldiers, though better fed than those of any army except the American, do not get one-half the solid nutriment which the idler of club-loungers considers indispensable for his sustenance. An athlete in training is allowed even less food; yet he prepers on the limited fare, and prolongs his life by the regimen by which he has been subjected.

King Victor Emmanuel was a monarch of the most robust physique; yet he only ate one meal per day, and it is manifestly absurd for any man to require three more or less weighty meals, and an afternoon cup of tea, to support the exertion of walking to the club, riding an hour in the park, writing a note or two and dancing a couple of miles around a ball room. The ancients had their "amethusoi," or "sober stones" by which they regulated their indulgences at table. The moderns have not even this. But they have their gout and their liver to warn them, when it is too late, that nature has been overtaken.

## The Air We Breathe.

It is composed of one part of oxygen and four parts nitrogen. The former supports life, the latter extinguishes it. The more oxygen there is, the livelier, the healthier and the more joyful are we; the more nitrogen, the more sleepy and stupid and dull we become. But if all the air were oxygen, the first lighted match would wrap the world in instant flame; if all were nitrogen, the next instant there would not be upon the populated globe a single living creature. When oxygen was discovered by Priestley, nearly 80 years ago, there was great jubilation among doctors and chemists. The argument was plausible, and seemed perfectly convincing: "If oxygen is the life and health of the atmosphere, as we have found out how to make oxygen, we have only to increase the quantity in the air we breathe, in order to wake up new life, to give health to the diseased, and youth to the aged." But, on trial, it was found that it made a man a maniac or a fool, and if continued, a corpse. Various other experiments have been made to improve upon the handiwork of the Allwise Maker of the Universe, but they have been successive failures, and thinking men have long since come to the conclusion that, as there can be no improvement upon the cold water of the first creation in slaking thirst, so there can be no addition made to pure air which will better answer its life-sustaining purposes. And as there is not, in all nature, a still, warm atmosphere that does not instantly begin to degenerate decay, corruption and death, so there is no chamber of the sick, graduated to a degree, that will not hasten the end desired to be averted.

HIPPOPHAGY IN FRANCE.—Some very interesting statistics have been published by the society for promoting the use of horse flesh and the flesh of asses and mules as food, showing how steadily the consumption of these articles of diet has been increasing in Paris and the provinces since the foundation of the society in 1866. The weight has increased from 171,300 lbs. in 1866 to 1,932,620 lbs. in 1879. In the principal cities of the provinces the consumption of horse-flesh may be considered to have fairly taken root. At Marseilles, in 1870, there were 599 horses eaten, 1,031 in 1875, and 1,533 in 1878. At Nancy, 165 in 1873, over 350 in 1876, and 705 in 1878; at Rheims, 291 in 1874, 423 in 1876 and 334 in 1878; at Lyons, 1,839 in 1873 and 1,313 in 1875. In both the latter cases some difficulties had been thrown in the way by the town authorities, as was the case recently at Chalons-sur-Marne, where the Mayor fixed the price of the horse-flesh at a higher rate than that of beef. The average price of horse meat is from 25 to 30 cents per lb. Each horse furnishes about 200 kilogrammes (four cwt.) of meat, which is capable of being prepared in many by no means unappetizing ways, such as *pot-au-feu*, boiled, roast, hashed, haricot, juggled fillet, etc.

TOO MUCH CIGARETTE.—There is too much cigarette. The small boy has got it into his month, and it is using him up. The Philadelphia *Times* says physicians and other people in that city are pained by the spectacle, growing more common every day, of pale-faced lads, ranging in age from 6 to 20 years, who are puffing their little lives away in smoking. Day and night they throng the streets, where the peculiarly offensive odor generated by cigarettes made of cheap paper and bad tobacco renders their smoking as obnoxious to others as it is hurtful to themselves. Every evening before the doors of the theaters they raise a cloud of foul smoke that is equally injurious to their own rickety constitutions and to the noses of their victims. Doubtless, also, they carry their pernicious habit into their homes—when they are old enough to do so without risk of the spanking that they deserve—thus still further doing harm to themselves and making other people uncomfortable.

PHENOMENAL EXUDATION OF BLOOD.—The Chicago *Daily News* of Dec. 20th, says: The doctors are puzzled and interested by a peculiar case on the west side. A 14-year-old son of Wm. Crawford, captain of a tug boat, has for some years been sweating blood at times, and lately has had severe attacks which alarmed his parents. His infirmity comes on him usually after taking cold. Great black patches appear on his body, from which blood drops, the size of a pinhead, exude. Blood flows from his mouth, nose, ears, stomach, and even from his bladder and kidneys. No pain accompanies these discharges, but they make his blood thin, and weaken him. Sudden fright or excitement will easily check the flow. He is mentally bright, and his father, mother, brothers and sisters are strong and healthy. The physicians who have taken an interest in his case, propose sending him to Edinburgh and London, for examination by the Academy of Surgeons.

CURE FOR DANDRUFF.—Mr. John L. Davis, in the *Journal of Pharmacy*, asserts (having fully tested it in his own case), that a preparation of one ounce of sulphur and one quart of water, repeatedly agitated during intervals of a few hours, and the head saturated every morning with the clear liquid, will, in a few weeks, remove every trace of dandruff from the scalp, and the hair will become soft and glossy. He says: "I do not pretend to explain the *modus operandi* of the treatment, for it is well known that exhaled sulphur is almost or wholly insoluble, and the liquid used was destitute of taste, color or smell. The effect speaks for itself."



THE Puget Sound Courier says: Coal mining has begun in earnest at the New Carbon Hill mines, of the Puyallup. Last Tuesday 500 tons went over the road to Portland for the O. R. & N. Co. The present capacity is 100 tons per day.



## Physical Studies of Lake Tahoe.—No. 2.

(Written for the Press by PROF. JOHN LE CONTRE.)

## Transparency of the Waters.

All visitors to this beautiful lake are struck with the extraordinary transparency of the water. At a depth of 15 or 20 meters (49.2 or 65.62 ft.) every object on the bottom, on a calm, sunny day, is seen with the greatest distinctness. On the 6th of September, 1873, the writer executed a series of experiments, with the view of testing the transparency of the water. A number of other experiments were made, Aug. 28th and 29th, under less favorable conditions. By securing a white object of considerable size—a horizontally-adjusted dinner-plate about 9.5 inches in diameter—to the sounding-line, it was ascertained that (at noon) it was plainly visible at a vertical depth of 33 meters, or 108.27 English ft. It must be recollected that the light reaching the eye from each submerged object must have traversed a thickness of water equal to at least twice the measured depth. In the above case it must have been at least 66 meters, or 216.54 ft. Furthermore, when it is considered that the amount of light regularly reflected from such a surface as that of a dinner-plate, under large angles of incidence in relation to the surface, is known to be a very small fraction of the incident beam (probably not to exceed 3% or 4%), it is evident that solar light must penetrate to vastly greater depths in these pellucid waters.\*

At an angle of..... 8° 35' 000 were reflected  
 " " " " " 15° 150 " "  
 " " " " " 30° 51 " "  
 " " " " " 45° 23 " "  
 (Traité d'Optique, p. 125.)

Moreover, it is quite certain that if the experiments, in relation to the depths corresponding to the limit of visibility of the submerged white disk, had been executed in the winter instead of summer, much larger numbers would have been obtained. For it is now well ascertained, by means of the researches of Dr. F. A. Forel, of Lausanne, that the waters of the Alpine lakes are decidedly more transparent in winter than in summer. Indeed, it is reasonable that when the affluents of such lakes are locked in the icy fetters of winter, much less suspended matter is carried into them than in summer, when all the sub-glacial streams are in active operation.

The experimental investigations of

Prof. F. A. Forel,

On the "Variations in the Transparency of the Waters" of the Lake of Geneva (Archives des Sci. Phys. et Nat., Tome 59, p. 137, et seq., Juin, 1877), show that the water of this famous Swiss lake is far inferior in transparency to that of Lake Tahoe. Prof. Forel employed two methods of testing the transparency of the waters of Lake Geneva at different seasons of the year.

1st. The direct method, by letting down a white disk 25 centimeters (about the size of the dinner-plate used by me), attached to a sounding-line, and finding the depths corresponding to the limit of visibility. For the seven winter months, from October to April, he found, from 46 experiments in 1874-75, a mean of 12.7 meters, or 41.67 English ft.; and for the five summer months, from May to September, he found, during the same year, a mean of 6.6 meters, or 21.65 ft. The maximum depth of the limit of visibility, observed by him, was 17 meters, or 55.88 English ft.; being a little more than half the depth found by me in Lake Tahoe, early in the month of September.

2d. The other method, employed by Prof. Forel, was the indirect or photographic method. This consisted in finding the limiting depth at which solar light ceased to act on paper, rendered sensitive by means of chloride of silver. If we assume that the same laws which regulate the penetration of the actinic rays of the sun are applicable to the luminous rays, this method furnishes a much more delicate means of testing the transparency of water; and especially of determining how deep the direct solar rays penetrate. Forel found the limit of obscurity for the chloride of silver paper, in winter, to be about 100 meters, and in summer, about 45 meters; numbers (as we should expect) far exceeding those furnished by the limit of visibility of submerged white disks. Assuming that the index of transparency of the water of Lake Tahoe to be in winter no greater than twice that of Lake Geneva, it follows that, dur-

\*According to the experiments of Bouguer, out of 1,000 rays of light incident upon polished black marble, the following were the proportional numbers reflected at the several angles measured from the surface of the marble.

So few exact observations have been made on the transparency of sea-water, that it may be proper to add the following results obtained by Capt. Duperrey during the "Voyage de la Coquille." The apparatus employed consisted of a circular board 60 centimeters in diameter, painted white; to which a weight was attached, and so adjusted that when let down by a line the white disk descended horizontally in the water.

There are numerous lakes in the Scandinavian peninsula, whose waters are said to be very transparent; objects in the bottom being visible at depths of from 30 to 37 meters, more specifically, in Lake Wetter in Sweden, a fathoms is said to be visible at a depth of 20 fathoms, on 36.575 meters. But such vague popular estimates are scarcely worthy of consideration. Still less trustworthy are the unverified accounts we have, that in some parts of the Arctic ocean shells are distinctly seen at the depth of 30 fathoms; and that among the West India Islands, in 80 fathoms of water, the bed of the sea is as distinctly visible as if seen in air. (Somerville's Phys. Geog., Am. Ed. 1868, p. 199.) Perhaps it should have been put feet instead of fathoms.

ing this cold season, the solar light must penetrate the waters of the former to a depth of at least 200 meters. From his admirable photometrical investigations Bouguer estimated (Traité d'Optique sur la Gradation de la Lumière, La Caille Ed., Paris, 1760), that in the purest sea water, at the depth of 311 Paris ft., or 101 meters, the light of the sun would be equal only to that of the full moon, and it would be perfectly opaque at the thickness of 679 Paris ft., or 220.57 meters. In relation to the comparative transparency of different waters, we may be permitted to cite a few results obtained by the method of depths corresponding to the limit of visibility of white disks. Even absolutely pure water is not perfectly transparent; it absorbs a certain amount of light, so that at a determinate depth it is opaque. The following table presents us comparative results which may be of some interest:

Water.	Season.	Depth of visibility in meters.	Observer.
Lake of Geneva...	Summer	5.30	Min'm F. A. Forel
" " "	"	8.20	Max. " "
" " "	"	6.00	Mean " "
" " "	Winter	10.20	Min'm " "
" " "	"	17.00	Max. " "
" " "	"	12.70	Mean " "
Lake Tahoe.....	Summer	33.00	Max. Nobis
Pacific O., Wallis I.	"	40.00	Capt. Borard
Mediterranean near Civita Vecchia	"	42.50	P. A. Secchi
Atlantic O.....	"	49.50	J. L. F. de Pourtales

Inasmuch as our observations on the water of Lake Tahoe were made during the latter portion of August and the beginning of September, it seems probable, from Forel's results in Lake Geneva, that winter experiments would place the limit of visibility as deep, if not deeper, than Pourtales found in the Atlantic ocean. It may be proper to add that Prof. Forel does not ascribe the variations in the transparency of water of the Swiss lake with the season exclusively to the greater or less abundance of suspended matter; but also to the fact, which seems to be confirmed by the experi-



Angular Hailstones.

ments of H. Wild, that increase of temperature augments the absorbing power of water for light.

Place.	State of Weather.	Date of Obs.	Limit of Visibility.
Offak.....	Calm & Cloudy	Sept. 13	13 meters
Offak.....	Calm & Clear	Sept. 14	23 meters
Pt. Jackson	Calm	Feb 12 & 13	12 meters
Ascension I.	Favorable	Jan. (11 exp'ts)	9 to 12 meters

Vide Œuvres Complètes de "François Arago," 2d ed., Tome 9, p. 203—Paris, 1865.

It is evident that this cause is more efficient in summer than in winter: Superior transparency of waters in pools in limestone districts. But the transparency of the waters occupying pools in certain limestone districts, unquestionably far surpasses that of any of the Alpine lakes on any of the inter-tropical seas. The observations and experiments executed by the writer during his investigations—in the month of Dec., 1859—in relation to the "Optical Phenomena Presented by the Silver Spring," in the State of Florida, (Vide Proc. Am. Assoc. Adv. of Sci., vol. 14, p. 33-46; Aug., 1860. Also Am. Jour. Sci., 2d series, vol. 31, p. 1-12; Jan., 1861), indicated a degree of transparency in the water surpassing anything which can be imagined. The depth of this remarkable pool varied, in different portions, from 30 to 36 English ft., or from 9.14 to 10.97 meters; yet "every feature and configuration of the bottom of this gigantic basin was almost as distinctly visible as if the water was removed and the atmosphere substituted in its place." "The sunlight illuminated the sides and bottom of this remarkable pool, nearly as brilliantly as if nothing obstructed the light. The shadows of our little boat, of our overhanging heads and hats, of projecting crags and logs, of the surrounding forests, and of the vegetation at the bottom, were distinctly and sharply defined." The experiments in relation to vertical depth at which printed cards could be read, when viewed vertically, afforded a good illustration of the extraordinary transparency of these waters. Comparative experiments in relation to the distance at which the same cards could be read in the air, showed that when the letters were of considerable size, say 6 or 7 millimeters or more in length, on a clear and calm day they could be read at about as great a vertical dis-

tance beneath the surface of the water as they could be in the atmosphere. But it would be a grave error to imagine that these results indicate that sunlight undergoes no greater diminution in traversing a given thickness of this water than in passing through an equal stratum of air. For, in both cases, when the cards are strongly illuminated, the reading-distance is limited by the smallness of the images of the letters on the retina, and not by the amount of light reaching the eye. Nevertheless, these experiments prove conclusively that, at the depth of 10 meters, the illumination was sufficiently intense to secure this limiting condition, and thus serves to convey a more distinct idea of the wonderful diaphanous properties of these waters than any verbal description. The experiments were executed about noon at the winter solstice (lat. 29° 15' north), and were made on various-sized letters, and at depths varying from 2 to 10 meters. It would be exceedingly interesting to test the transparency of the waters of similar springs in the limestone districts by the limit of visibility of white disks, when the depth is sufficiently great to admit of the application of this method. The famous fountain, situated about 10 or 15 miles south of Tallahassee in the State of Florida, called Wakulla spring, is represented to be deeper than the Silver spring, and to be equally transparent. But we have, as yet, no trustworthy measurements, or observations in relation to the comparative diaphanous properties of the waters of other limestone pools.†

## Cause of Superior Transparency.

It only remains to indicate the causes which produce the extraordinary transparency of the waters occupying the Silver spring. It may be remarked that these diaphanous properties are perennial. They are not in the slightest degree impaired by season, by rain, or drought.

The comparatively slight fluctuations in the level of the water of the pool produced by the advent of the rainy season, are not accompanied by any turbidity of its waters. At first sight it may seem paradoxical that in a country where semi-tropical rains occur, the waters of this spring should not be rendered turbid by surface drainage. But the whole mystery vanishes when we consider the peculiar character



A German Horse shoe.

of the drainage of this portion of Florida.

Although the surface of the country is quite undulating or rolling, the summits of many of the hills being 30 or 40 ft. above the adjacent depressions; yet there is no surface drainage. There is not a brook or rivulet to be found in this part of the State. The whole drainage is subterranean; even the rain-water, which falls near the banks of the pool and bold stream constituting its outlet, passes out by underground channels. There is not the slightest doubt but that all of the rain-water which falls on a large hydrographic basin, passes down by subterranean channels and boils up and finds an outlet by means of the Silver spring, and the smaller tributary springs which occur in the cove along the margin of its short discharging stream. The whole surface of the country in the vicinity, and probably over the area of a circle of 10 or 15 miles radius, whose center is the Silver spring, is thickly dotted with lime-sinks, which are the points at which the surface-water finds its entrance to the subterranean passages. New sinks are constantly occurring at the present time. The beautiful miniature lakes whose crystal waters are so justly admired, which occur in this portion of Florida, are doubtless nothing more than lime-sinks of ancient date. Under this aspect of the subject it is obvious that all the rainfall on this hydrographic basin boils up in the Silver spring, after having been strained, filtered and decolorized in its passage through beds of sand, tortuous underground channels. It thus comes out, not only entirely free from all mechanically-suspended materials, but completely destitute of every trace of organic coloring matter. For this reason there is a striking contrast between the color and transparency of the waters of the Silver-spring stream and those of the Ochlawaha river at their junction, the latter draining a country whose drainage is not entirely subterranean.

The above-mentioned conditions seem to be fully adequate to persistently secure the waters of this spring from the admixture of insoluble and suspended materials, as well as from the discoloration of organic matters in solution. But, inasmuch as these waters appear to be more diaphanous than absolutely pure water, it is possible that the minute quantity of lime which they hold in solution, may exercise some

influence in augmenting their transparency. There is nothing *a priori* improbable in the idea that this optical, as well as the other physical properties of the liquid, may be altered by the materials held in solution. This is an interesting physico-chemical question, which demands experimental investigation.

## Angular Hailstones.

A remarkable hailstorm passed over Thymbra farm, on the plains of Troy, Asia Minor, some time since, on which occasion angular hailstones fell, similar to those figured in the accompanying engraving. Mr. Frank Calvert, in describing the phenomenon to the *Scientific American*, says: A gale was blowing at the time from the southward, when a sudden massing of dark clouds flying in various concentric directions was observed. As the clouds passed over the farm there was a heavy discharge of hailstones, for the space of about five minutes, which whitened the ground with an icy covering. The hailstones were above the average size. The remarkable feature, however, was the extraordinary shapes these stones presented, some of which were round or irregular with angular projections, others flattened with but two of these points. Shapeless masses of ice also fell. The stones were whiter at the core than on the external portion. To account for this phenomenon, it may be suggested that the upper portion of the cloud was suddenly converted to snow, which, falling and gyrating in the lower, formed the nucleus around which the vapor was condensed and frozen; while a rotatory motion gave the round form to the body, or added to the spherical nucleus of the snow, the angular portions of the crystals increased in size. The delicate arrangement of the original hexagonal crystals of the snow was destroyed, which explained the various shapes and irregular number of angles in the hailstones. The drawing is made from a sketch taken at the time, which represents the natural size of the hailstones. Violent gusts of wind, but no electrical discharge, accompanied the fall.

## A Curious Horse Shoe.

A few weeks since we took occasion to mention that a German manufacturer had invented a horse shoe composed of iron and hemp, which is said to be meeting with great favor. At that time we asked some German friends to favor us with a sketch from which to make an engraving. The suggestion met with a prompt response, and we this week give an engraving showing the new shoe.

It is of malleable iron, having a deep wide groove into which tarred hemp rope is firmly wedged. The rope protrudes beyond the rim of the iron and the whole is said to form a light and extremely serviceable shoe.

The advantages claimed for it are that there is no liability of the horse falling or slipping, no jerking or straining of muscles by an accidental or misstep. It is also thought to be a preventive of cracking, etc., of hoofs. Easier and surer walking is secured on the smoothest pavement.

These shoes are worked from the best iron made and fitted cold. The tough black oakum will last, it is claimed, as long as iron. The shoe made in this manner has, it is said, met the approval of Emperor William. We do not know of its being patented in this country, though it may be.

BULLION IN TRANSIT.—Some time ago, some bullion, shipped by Christ, Lark of Unionville, to San Francisco, was attached in the express car, at Reno, by Jerry Schooling, for the Arizona company's debts. It was expected that an interesting suit would result from the action of the Washoe county Sheriff, in attaching the bullion while in the possession of Welle, Fargo & Co. This point will not be decided, however, as the matter has been compromised. The *Silver State* says that Mr. Schooling retains possession of the bullion, but releases an attachment on Christ, Lark's store, at Unionville, which he also attached for the Arizona company's debts.

AT BODE, 54 claims were jumped on New Year's morning, and armed men are now in possession. This is done under the law that requires a certain amount of assessment work to be done before the end of the year. Many Mill Creek claims were taken in the same manner.

THE Central Pacific railroad folks are now taking out 700 tons of coal per day from their Almy mines, Utah, and besides supplying the Central Pacific, are sending coal to Arizona to supply the Southern Pacific locomotives.

THE *Nugget* says that the building of a railroad from Benson to Tombstone will begin in a short time. The arrangements have all been perfected, under the management of Mark L. McDonald, the well-known stock broker of San Francisco.

LOS CERRILLOS district, New Mexico, is to have a smelter.



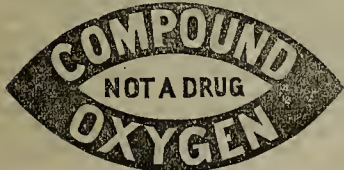
## Adverse Claims in Mining Application.

The following circular of instructions has been received by the Register and Receiver of United States Land Offices throughout the country:

DEPARTMENT OF THE INTERIOR,  
GENERAL LAND OFFICE,  
WASHINGTON, D. C., Dec. 10, 1880.

Gentlemen:—In the matter of applications for patents for mining claims, where adverse claims are filed in the manner prescribed by law and the official instructions, you will in notifying the adverse claimant that he will be required to commence proceedings in a court of competent jurisdiction within 30 days thereafter, at the same time advise him that he will be required within 15 days after such suit has been commenced, to file with you a certificate of the clerk of the proper court that proceedings have been commenced, and the date thereof. It frequently happens that there is no court which has exclusive jurisdiction, and in certain States it is competent to commence such suit in any District Court of the State. It follows that the applicant for patent (the defendant), in order to prove that no suit has been commenced, would be compelled in such cases to furnish the certificate of every court in which the suit might have been instituted; while the adverse claimant can always, at the minimum expense and trouble, furnish the certificate of the court in which he has commenced suit. In case no certificate of the clerk of court shall have been filed with you within 45 days after the filing of adverse claim, the applicant for patent will be allowed to complete his entry upon making affidavit that suit has not been commenced by the adverse claimant. Very respectfully,  
J. A. WILLIAMSON, Commissioner.

THE ICE HARVEST.—Prosser creek, Boca and Camp 20 are the points at which natural ice is cut for the market below. Prosser creek is about seven miles below Truckee, where Prosser creek forms a junction with the Truckee river. Boca is about a mile and a half beyond, and Camp 20 about four miles still further down the Truckee river. These points, though considerably lower than Truckee are much colder, the thermometer at Prosser creek frequently being from 10° to 15° lower than at this point. At Boca, Wednesday morning it was 15° below zero. The low temperature of these points and the almost chemically pure water with which they are supplied, give them great advantage over any other section for the production of good marketable ice. At Prosser creek is located the works of the Summit Ice Co. At Boca the Pacific Ice Co. is located, and at Camp 20, the People's Ice Co., holds forth. The capacity of the Summit Co., is greater than either or both of the others. Mr. James McDonald is the foreman and J. B. Brogan the agent. They have had a hard fight to make this season against the snow. They have had between 60 and 100 men employed for a week scraping snow from off their immense pond.—*Truckee Republican.*



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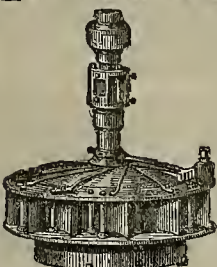
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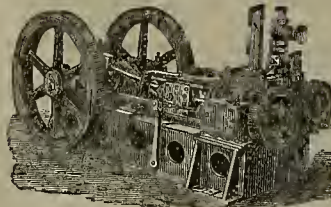
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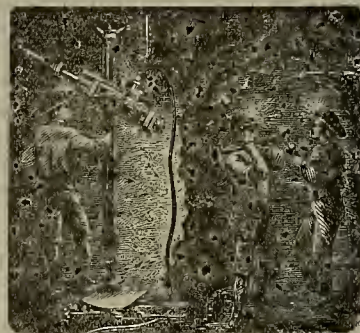
Notice is hereby given that George R. Foard, of No. 18 First Street, San Francisco, is the sole authorized agent for the sale of our manufactures, consisting of Rock Drills, Air Compressors, and duplicate parts of either in the territory known as the Pacific Slope, formerly under the agency of John B. Reynolds, but now under the sole agency of George R. Foard; and that no other person or persons have any right or authority to represent themselves as the agents of this Company within the above mentioned territory.

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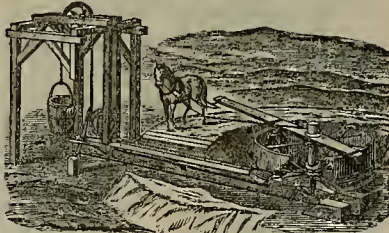
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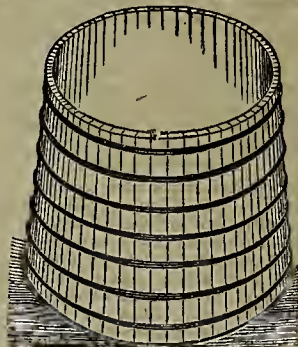
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## Formation of the San Francisco Peninsula

### Geology and Artesian Wells.

A proper knowledge of the various geological formations underlying the different portions of this city is very desirable, in view of the probability of obtaining water at different points. Owing to the extensive excavations made in the city for grading streets and lots, an excellent opportunity is now furnished to examine the strata thus revealed near the surface; and if all the data and facts concerning the different strata passed through in sinking the artesian wells that have been bored in this city, could be obtained, compiled and mapped, we could then have a good knowledge of the sub-strata.

The only person thus far who has taken any interest in collecting any facts on this subject, is Mr. C. D. Gibbs, curator of the department of mineralogy of the California Academy of Sciences. We published not long since a diagram made by him, showing an imaginary section through this city, and showing the location and depth of various wells.

At the last meeting of the Academy Mr. Gibbs presented some 200 specimens of rocks, etc., which he had collected during his leisure hours in the last two years, and he acknowledges that he has barely made a commencement of the work that should be done. The specimens are numbered and accompanied by a catalogue. They consist principally of sandstones, slates, serpentine rocks, and accompanying minerals. Several specimens of the same character appear for the purpose of showing the different localities in which they appear.

When Mr. Gibbs took charge of the department of mineralogy for the Academy there was no series of specimens representing the geological formation or the character of minerals to be found on the peninsula and in the vicinity of San Francisco. This was probably due to the fact that the place was too near home.

In presenting the specimens to the Academy at the last meeting, Mr. Gibbs said:

The principal rock of this vicinity is a fine-grained, compact, calcareous sandstone, which effervesces freely with acid. The prevailing color is blue or gray, but from the action of the weather and surface water it becomes a dirty brown by the decomposition of the protoxide of iron which it contains. Some of the dark blue sandstone is very rough and hard to drill. The sandstone in some places is traversed by small veins of carbonate of lime. In other places thin seams of quartz are found running in various directions.

Associated with the sandstones are beds of black or brown soft shale, seams of hard black slaty shale, and a hard blue shale. Iron pyrites are found on some of the sandstones and hard shales.

### Serpentinoid Rocks.

A belt of serpentine also occupies a large portion of the city, if one may judge by the occasional outcrop to be found for miles in extent southeast from Fort Point. Commencing at Fort Point, the extreme northern point of the city, where it forms a prominent ridge one and a half miles in extent, and culminating in a peak 400 ft. high, about one mile south of the fort, then sloping gradually towards Mountain Lake. It is seen again at Lone Mountain, near the center of the belt; also at Jefferson square, near the eastern limit of the belt (a short distance N. W. of the City Hall); it is there in contact with the sandstone. At the Spring Valley reservoir at Market street it forms a knob, near the center of the belt; the elevation of knob is 200 ft. It makes its appearance again south of Mission creek, at Alameda street and Potrero avenue; from here it extends along the ridge to Point San Quentin, about the eastern limits, and six miles from Fort Point.

And the Dry Dock at Hunter's point is excavated in a ridge of serpentine. This is near the western limit, and makes the west boundary of the belt about eight miles in length, and the width of the belt about one and a half miles. It is bounded on both sides by sandstone, which overlies it on the east, and underlies it on the west.

But within the limits of this serpentine belt, other formations are found. At Fort Point a body of sandstone and shale between 200 and 300 ft. thick is imbedded in the serpentine, and dips east. Again at the Herman street cut, north of the reservoir, is a well-exposed strata of sandstone formation, measuring 355 ft. thick, 42 ft. of fine blue sandstone being near the center, with 140 ft. of brown and black shale on the east, and on the west 176 ft. of black shale containing sandstone and calcareous boulders; the dip here is to the east, under the serpentine, and it overlies the serpentine on the west. Also at block 47 on Center street, near Potrero avenue, is a very hard blue sandstone 30 or 40 ft. wide imbedded in the serpentine. Other portions of the belt are covered with sand and alluvial deposits, the depth of which can only be told by deep artesian borings; no well in the belt that I have heard of has yet reached it.

The serpentines found in the city show a variety of colors, and are made up of hard, dark-colored round boulder-like masses filled with crystals of bronzed, and imbedded in a softer shaly serpentine. The Orphan asylum is partly constructed of the hard, dark-colored portions

of this rock. The principal colors are, dark olive green, light green, blue, brown, velvety-black, purple, yellow, reddish-yellow and bronzes.

Some of these serpentines contain amianthus in fine reticulated and lamellar seams, crystals of bronzed, white crystals, supposed to be brucite, and fine stellated white crystal, supposed to be nemalites.

Associated with the serpentine, are veins three or four inches thick of hydromagnesite (a hydrous carbonate of magnesia), also a yellow ochreous matrix containing traces of cinnabar, and a highly crystalline metamorphosed silicious rock, very hard, and colored yellow, green and white, and is susceptible of a polish. This rock is similar to the outcrop at the New Almaden mines.

Amongst the other minerals and metals found in the city are, cinnabar, pyrolusite (the oxide of manganese), native mercury, and I have also heard of gold being found in the seams of quartz traversing the sandstone, and in black sand in artesian wells, but have not seen any of it. The black sands on the beach contain gold, and have been worked.

At the southwest corner of Franklin park near Potrero avenue, is a stratum of fine molding clay, which I understand is used by the molders of brass or other fine castings, who take it away by this sack as they need it.

### A Notable Gift.

California is a mining country and has been since owned by the United States. It owed its existence as a State to mines and its prosperity was based upon them. Yet, in no country in the world, perhaps, has the State, as a State, paid less attention to mining matters. And in no other country where so many people had grown rich from an industry, has that industry been so neglected in its higher branches. Mining has never received any fostering care at the hands of this State, or from individuals of this State. It is only lately that any effort has been made to do anything in this direction, in the foundation of the Mining Bureau. Our State Geological Survey was nipped in the bud, and even the Bureau has not suitable quarters or money enough to carry out the objects for which it was formed in a manner commensurate to the needs of a great State.

When the State was asked by a great government to exhibit at its exposition a collection of the samples of its mineral products, it could not afford to do it; and it was left to the munificent liberality of a citizen of another State to help California out. Mr. Mackay's donation was all that allowed California to be represented at Paris. And his was one of the few gifts to the mining interest that has been made.

Now, however, comes another gentleman, closely identified with the mining interests of another State, and makes our city a present, in the manner expressed in the following letter:

SAN FRANCISCO, Dec. 31, 1880.

To Andrew J. Moulder, Esq., Secretary Free Public Library:—My Dear Sir: Believing in the doctrine that good books are the best and safest companions to be selected by young people, I wish to contribute my mite in improving the utility of your worthy institution by enclosing a check for \$1,000, to be invested in books on mining, metallurgy, geology, mineralogy, assaying, chemistry, and kindred sciences, on which subjects, I am informed, you have but few books.

Mining forms one of the great interests of the Pacific coast, and, while mere speculation is undoubtedly a detriment to prosperity, legitimate mining must largely contribute to our welfare. Intelligent mining can only be carried on by a study of the experience already made in our own and other countries.

Please, therefore, invest this sum in such books as you think will best attain the above object. I am very truly yours,

ADOLPH SUTRO.

Mr. Sutro has no doubt received the thanks of the library trustees; and he also ought to receive the thanks of the city supervisors, as being the first man, to our knowledge, to donate anything in this city to assist or foster in any way in our midst the industry by which so many of us directly or indirectly gain our living. Mr. Sutro's letter is a very sensible and plain one and to the point. Now, let some other gentleman follow suit in the same direction, and set up a similar collection of mining and metallurgical works in the State Mining Bureau room. Mining books are expensive, like all technical publications; and we have no complete sets in this city, as we ought to have.

We are sure that all persons interested in legitimate mining will join us in hearty thanks to Mr. Sutro for his very acceptable, timely and thoughtful gift.

LUNDY, or Mill Creek, a mining camp near here, was connected with Bodie on January 1st by a telegraph line. This place has been attracting considerable attention lately, owing to the eminently favorable results obtained in the milling operations of the May and Lundy mines. The Tioga district is also favorably regarded by capitalists.

DURING the year 1880 the total assessments levied on incorporated mines in Nevada county amounted to \$174,500. In Placer county the assessments foot up to \$205,200.

## Academy of Sciences.

The annual meeting of the California Academy of Sciences was held on Monday evening last, Prof. Davidson in the chair.

This report of judges and inspectors of election was read, and the following officers were declared selected to serve during the coming year; President, George Davidson; Vice-President, Justin P. Moore; Second Vice-President, Herman H. Behr; Recording Secretary, Charles G. Yals (of the MINING AND SCIENTIFIC PRESS); Corresponding Secretary, S. B. Christy; Treasurer, Elisha Brooks; Librarian, Chas. Troyer; Director of Museum, W. G. W. Harford; Trustees, Wm. Ashburner, Geo. E. Gray, Robert E. C. Stearns, B. B. Redding, Thomas P. Madden, Ralph C. Harrison, J. M. Macdonald.

### Annual Report.

The report of the Secretary showed an expenditure of \$7,500 for the year, and an overdraft at bank of about \$1,000. The Librarian's report enumerated 463 valuable books received as exchanges or donated during the past year. The Librarian said that his now lacked sufficient shelf-room, and fully three-quarters of the books were in paper covers, yet unbound, and at least 1,000 volumes required binding. The long interval since this Academy had published any book of its proceedings—the last being of 1876—had caused many valuable exchanges to cease sending them their publications. W. G. W. Harford, Director of the Museum, reported the receipt of many valuable specimens during the past year, among them a gift of 308 species of invertebrates, largely fishes, donated by the Smithsonian Institute. He stated that the benefactors were many, and the donations received the past year highly important. Especial thanks were acknowledged to B. B. Redding for his constant and almost unrelenting additions to every department of the Academy's Museum. C. D. Gibbs, Curator of Minerals, reported continual gifts which had largely increased and now outgrown all case-room, and many, after examination and classification, had been packed away in boxes, to await the time when the Academy would have more room; 778 specimens of minerals have been received during the year.

### Prof. Davidson's Annual Address.

The President then read his annual report for the year. He said, although the Academy had no ready money, its prospects were not as gloomy as last year. Then they were apparently going behind, but now times have improved, and he believed this year the Academy will be free from debt. From lack of ready money they had published no proceedings for three years. Agassiz, Gray and Hooker had told the members when here that the vitality of the Academy would certainly be judged by its published proceedings, and without these its work was like a talent laid up in a napkin, without benefit to anyone. A thousand dollars a year is fully required to keep up the Academy's annual proceedings. At the East, rich men contribute eagerly to such a purpose, and proceedings thus published bear the imprint, "Published by the George Peabody Fund," and thus insert the name of whoever the donor may be. The Academy's property on Market St. is at present depressed in price, but the trustees have it continually in view, and will attend to its disposition or utilization at the proper time. The officers, trustees and curators work in full harmony, without any pay, one person only receiving a very moderate salary as custodian of the property. He stated that there was a widespread interest abroad in the work the Academy was now doing.

The remainder of the address consisted of a very scholarly and scientific essay on the benefits of scientific investigation, and the relations of science and industry.

### News in Brief.

SLIGHT earthquake at Tehama on the 3rd inst.

HEAVY rains have caused great damage in Sicily.

SEA LIONS are destroying the fish in Monterey bay.

THE upper Columbia river is again open to navigation.

TWO envoys of the King of Abyssinia have arrived at Paris.

THE 34th case of cremation has occurred at Gothau, France.

NAPA City has adopted a stringent ordinance on the opium question.

THE decrease in the public debt during December was \$5,699,430.

THERE have been heavy falls of snow in Georgia, Louisiana and Texas.

THE Government is feeding the destitute Wallapai Indians, Arizona.

THE New York tenement house fire on Thursday, caused a loss of nine lives.

THE recent sleet storm in Oregon damaged orchards to the extent of \$30,000.

THE Chileans had arrived within 20 miles of the Peruvian Capital December 23rd.

THE total expenditure of the Canada Pacific to the end of November was \$18,500,000.

THE gross revenue of the United Kingdom for the quarter ending January 4th, was £19,500,000.

THERE are nearly 10,000 cords of wood piled up at Brown's station, on the Virginia and Truckee railroad.

By an accident on the Sioux City and Omaha railroad Tuesday, six men were killed and nine were badly injured.

THE annual report of the Union Pacific shows gross earnings of \$25,000,000, a large increase over the previous year.

TRAMPS in considerable numbers are beginning to arrive in Los Angeles from Arizona. They say that the Territory is overrun by people who get there by way of New Mexico, Nevada and Colorado, as well as California.

THE Panama Star and Herald of the 25th of December says the foreign fleet will shortly be the most powerful ever seen in the Pacific. H. B. M. steamship *Garnet*, recently in the Pacific, is reported in quarantine at Montevideo with yellow fever on board.

A. D. GOODRICH, manager of the transportation company, which had charge of the wrecked steamer *Alpena*, declares untrue the finding of the coroner's jury at Grand Huron, Mich., that the *Alpena* was unseaworthy, manned by an inexperienced crew and without proper life-saving apparatus.

## San Francisco to San Diego.

Persons who wish to take a short sea voyage for health or recreation will find the best route from San Francisco, especially in winter, in the direction of San Diego. If used to sea travel they can make it an enjoyable trip. There is always more or less agreeable company en route to Port Harford (San Luis Obispo landing), Santa Barbara, San Pedro (Los Angeles landing) and San Diego.

Leaving San Francisco at 9 A. M., the Pacific Coast Steamship line land their passengers at Port Harford about 7 o'clock next morning; at Santa Barbara about 7 P. M., San Pedro on the following morning. Here the steamer tarries till evening and reaches San Diego early the next morning.

For \$2 passengers may go by lighter up the harbor to Wilmington, where they take rail for 22 miles to Los Angeles. There they have five hours to wander about the picturesque town, with its air of American go-aba-dative-ness, mingled with a touch of Mexican *siesta-like* character which is pleasant after the bustle of a big city. After this five hours of observation they return to the steamer in time to proceed to San Diego that evening, arriving there next morning.

One who has never visited this semi-tropical part of California will be surprised to realize how much of real interest can be seen, and how much pure enjoyment had in so short a time.

It is an item of interest, while passing down the coast between Point Conception and Santa Barbara, to observe the surface of the water for leagues in one locality covered with petroleum issuing from springs in the ocean bed. In sunny weather the floating oil is tinted with all the varying and changing colors of the rainbow. The sea here is always smooth; that is, glassy, but of course the ocean swell is ever present.

At Santa Barbara the passengers usually have two hour time to take a mile and a half walk over the wharf and through the main business street of the ancient town. On a recent trip the writer found the time to take this walk and spend a half hour comfortably at the celebrated and finely located Arlington House.

The steamer makes San Diego early on the morning of the third day from San Francisco. The fare from San Francisco to San Diego in the cabin is \$15, and in steerage \$10. To Los Angeles the fare is the same. When you go by railroad, however, the fare to Los Angeles is \$23.50. Altogether the ocean trip is a pleasant one to take, and as it does not consume much time or cost much money, it could be conveniently made by many of our city stay-at-homes with benefit to their health.

## Our Agents,

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORN—San Francisco.  
A. C. KNOX—Pacific Coast.  
O. W. MCGRAW—Santa Clara county.  
M. P. OWEN—Santa Cruz county.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
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JARED C. HOAG—California.  
B. W. CROWELL—Colusa and Yolo counties.  
D. W. KELLNER—Fresno, San Benito, Monterey and San Luis Obispo counties.  
V. O. WARNOCK, Sonoma county.  
M. P. OWEN—Santa Cruz county, Cal.

### Nothing Short of Unmistakable Benefits

Conferred upon tens of thousands of sufferers could originate and maintain the reputation which AYER'S SARSAPARILLA enjoys. It is a compound of the best vegetable alternatives, with the Iodides of Potassium and Iron, and is the most effectual of all remedies for scrofulous, mercurial or blood disorders. Uniformly successful and certain in its remedial effects, it produces rapid and complete cures of Scrofula, Sores, Boils, Humors, Pimples, Eruptions, Skin Diseases and all disorders arising from impurity of the blood. By its invigorating effects it always relieves and often cures Liver Complaints, Female Weaknesses and Irregularities, and is a potent renewer of vitality. For purifying the blood it has no equal. It tones up the system, restores and preserves the health, and imparts vigor and energy. For forty years it has been an extensive use, and is to-day the most available medicine for the suffering sick anywhere.

FOR SALE BY ALL DEALERS.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.



**Metals.**

[WHOLESALE.]

WEDNESDAY M., Jan. 5, 1881.

<b>IRON.</b>		
American Pig, soft, ton.....	32 00	@33 00
Scotch Pig, ton.....	28 00	@27 00
American White Pig, ton.....	—	—
Oregon Pig, ton.....	41 00	@ 8
Refined Bar.....	7 00	@ 8 00
Horse Shoes, keg.....	—	—
Nail Rod.....	—	—
Norway, according to thickness.....	8 1/2	@ 9 1/2
<b>STEEL.</b>		
English Cast, D.....	16	@ 15
Black Diamond, ordinary sizes.....	13	@ 15
Drill.....	9	@ 10
Flat Bar.....	—	@ 16
Flow Steel.....	9	@ 10
<b>COPPER.</b>		
Ingot.....	—	@ 52
Sheet.....	—	@ 29
Sheathing, Tinned 14x48.....	—	@ 42
Nails.....	—	@ 10
Bolts.....	33	@ 42
Old.....	—	@ 18
Bar.....	—	@ 22
Precipitate, 100 fine.....	18	@ 19
<b>LEAD.</b>		
Pig.....	4 1/2	@ 5
Bar.....	—	@ 6
Pipe.....	—	@ 8
Shot, Discount 10% on 800 Bags.....	—	@ 9
Drop, per bag.....	—	@ 2 10
Buck.....	—	@ 2 30
Chilled.....	—	@ 2 50
<b>TIN PLATES.</b>		
10x14 I O Charcoal.....	—	@10 50
10x14 I O Coke.....	10	@10 00
Banca Tin.....	—	@25 00
Australian.....	—	@20 00
I O Charcoal, Roofing 14x20.....	20	@21 00
<b>ZINC.</b>		
By the Cask.....	—	@-10
Zinc, Sheet 7x3 ft. 7 to 10, D, less than cask.....	10 1/2	@-11
<b>NAILS.</b>		
Assorted sizes.....	4 00	@4 75

**Gold, Legal Tenders, Exchange, Etc.**

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, Jan. 5, 3 P. M.

**SILVER.**  
Gold Bars, 890@910. SILVER BARS, 10@18 1/2 cent. Is count.  
Exchange on New York, 12 1/2 @ 15, on London bankers, 49 1/2 @ 49 1/2. Commercial, 60; Paris, five francs \$ dollar; Mexican dollars, 33@30.  
London Consols, 98 5/16; Bonds (4%), 117 1/2.  
Quicksilver in S. F., by the cask, \$ 42 1/2 @ 45c. lb.

**Mining and Other Companies.**

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

**DIVIDEND NOTICE.**

OFFICE OF THE

**Standard Consolidated Mining Company,**

SAN FRANCISCO, DECEMBER 31st, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Twenty-four (24), of Seventy-five (75) Cents per share, was declared payable on Wednesday, January Twelfth (12), 1881, at the office in this city, or at the Agency of The Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.  
Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, California.

**DIVIDEND NOTICE.**

OFFICE OF THE

**Silver King Mining Company,**

SAN FRANCISCO, JANUARY 4th, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 13) of Twenty-five (25) Cents per share was declared, payable Saturday, January Fifteenth (15), 1881, at the office of the Company, room 19, No. 323 Montgomery Street, San Francisco, California. Transfer books will be closed January Eighth (8), 1881.

JOSEPH NASH, Sec'y.

**DIVIDEND NOTICE.**

**The German Savings and Loan Society.**

For the half year ending this date, the Board of Directors of The German Savings and Loan Society has declared a dividend on Term Deposits at the rate of five and two-fifths (5 2/5) per cent. per annum, and on Ordinary Deposits at the rate of four and one-half (4 1/2) per cent. per annum, free from Federal Taxes, and payable on and after the fifteenth (15th) day of January, 1881. By order, GEORGE LETTE, Sec'y.  
San Francisco, December 31, 1880.

**DIVIDEND NOTICE.**

**San Francisco Savings Union,**

532 California Street, corner Webb.

For the half year ending with thirty-first (31st) December, 1880, a Dividend has been declared at the rate of five and two-fifths of one (1) per cent. (5 2/5) per annum on term deposits, and four and one-half (4 1/2) per cent. per annum on ordinary deposits, free of Federal tax, payable on and after Monday, seventeenth (17th) January, 1881.  
LOVELL WHITE, Cashier.

**ANNUAL MEETING.**

THE ANNUAL MEETING OF THE

**Stockholders of the Silver King Mining Company.**

Will be held at the office of the Company, Room 10, No. 328 Montgomery street, San Francisco, on Tuesday, January Eleventh (11th), 1881, at 12 o'clock, noon, for the

election of a Board of Trustees to serve for the ensuing year, and for the transaction of such other business as may properly come before the meeting. Transfer books will close January Eighth (8th), 1881, at 12 o'clock, noon, and remain closed until after the meeting. San Francisco, December 20, 1880.

**Alpha Hydraulic Gravel Mining Company.**

Location of principal place of business: San Francisco, Cal. Location of works: Alpha Hill, Nevada County, California.

Notice.—There are delinquent upon the following described Stock, on account of Assessment (No. 2) levied on the nineteenth (19th) day of November, 1880, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amt.
James Ireland, Trustee.....	10	1,000	\$200
John H. Hayes.....	14	200	40
William H. H. Hamilton.....	18	1,000	200
Alexander Girvin.....	19	500	110

And, in accordance with law, and an order of the Board of Directors, made on the nineteenth (19th) day of November, 1880, so many shares of each parcel of said Stock as may be necessary, will be sold at public auction at the office of said Company, No. 216 Sansome Street, San Francisco, Cal., on Monday the tenth (10th) day of January, 1881, at the hour of one (1) o'clock, P. M., of said day, to pay said delinquent Assessment thereon, together with costs of advertising and expenses of sale.

JAMES IRELAND, Sec'y.  
Office—No. 216 Sansome Street, San Francisco, California.

**Amusements.**

**BALDWIN'S THEATER.**

THOMAS MAGUIRE.....Manager.  
CHAS. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer.

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**BUSH STREET THEATER.**

CHAS. E. LOCKE.....Lessee and Manager.

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KARLING BROS.....Managers.

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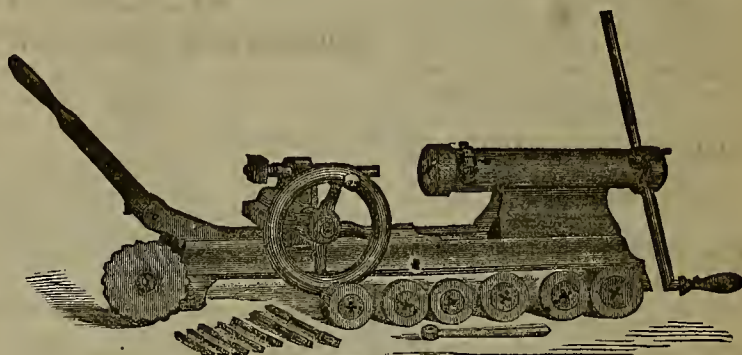
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C, " 26 " " 7 " " " " 3/8 to 1 "  
D, " 53 " " 6 " " " " 1/2 to 1 1/2 "

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ALL STYLES OF FANCY HEAD BOLTS.

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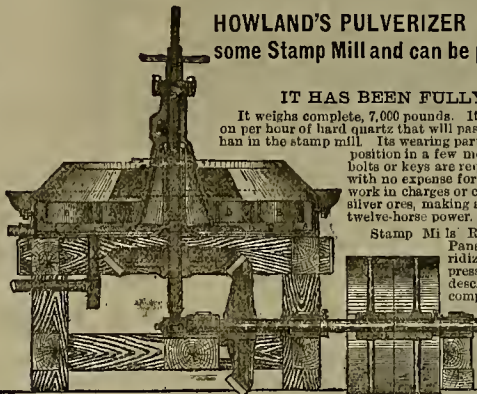
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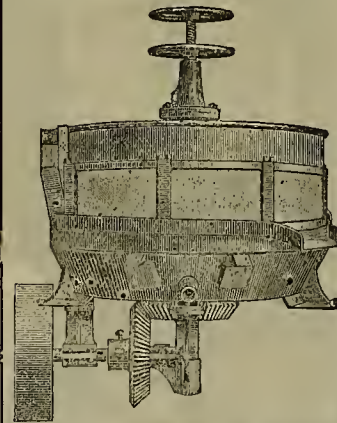
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Great saving in time and money over the Wood Frame. It is made complete with Wrought Iron Frame ready to put upon the foundation. We construct Mills with Stamps weighing from 350 to 900 pounds for Gold and Silver Ores. Wet or Dry Crushing Mortars.

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This pan is designed to receive ore direct from a rock breaker and reduce it to the fineness necessary for amalgamation, thus taking the place of the ordinary stamp battery. The cost of this Mill places it within the reach of all; and one point of advantage not to be overlooked is the fact that the cost of erection, which adds so much to the expense of the stamp mill, after it leaves the foundry is, in this case, reduced to a fraction, as the Mill is complete in itself, and requires no expensive foundations, bed logs, battery frames, etc., but can be placed in position in a few hours after it arrives on the ground, without the aid of skilled labor. This simple arrangement, durable as it is, is a most important improvement in the working of gold ore, as it enables parties to construct and erect a mill at half the cost of a stamp mill, and with a great saving of time, and size of mill building. Each pan is capable of reducing 10 tons of average ore in 24 hours, the ore being first broken in a rock breaker, small enough to go through a half-inch screen. There is an important point in the action of this Mill, to which we desire to call the attention of miners and millmen. We allude to the grinding and scouring action on the gold before it is discharged. The value of this point cannot be over estimated, and it is not necessary to do more than mention the fact, as it will be at once recognized by all competent millmen who examine the pan in operation, and especially by those who have had to deal with tarnished or rusty gold, as it is commonly called, and which is often encountered in our mines, and which is such a cause of loss. The plan of feeding is the same as in the stamp mill, either an ore feeder or hand feeding being adapted, as may be desired. Parties interested in mining and mills can see the Pan in operation by calling at the OCCIDENTAL FOUNDRY, STEIGER & KERR, 137 First St., S. F.

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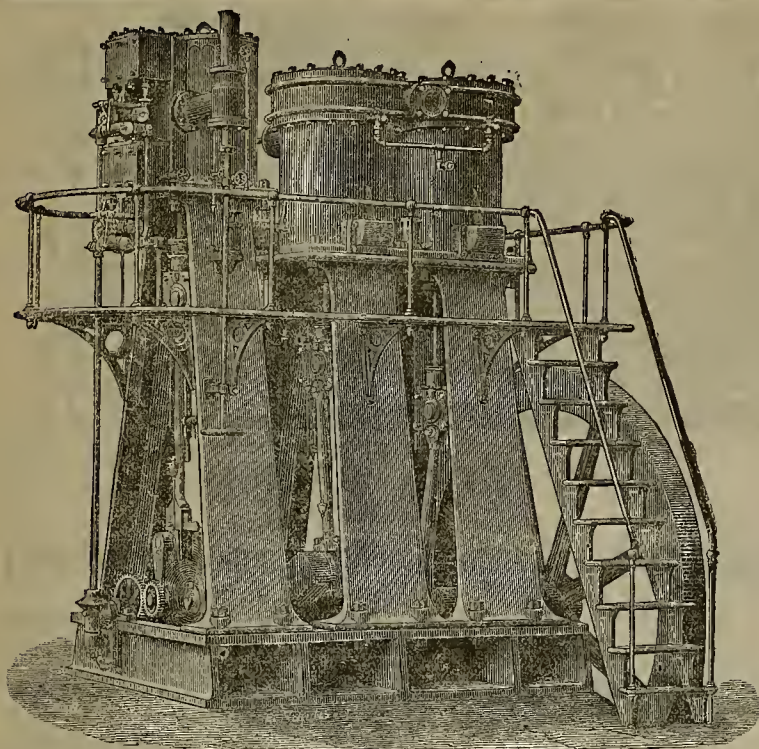
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Have no back or front heads to break. The only Machine that makes a perfect diagram. No expensive foundations required. Absolute economy in first cost and after working.

DISPLACEMENTS in air cylinder perfect. Showing less leakage and friction than our competitors and a superior economy of about 20 per cent.

Small Sizes made in Sections not to Exceed 300 lbs.

With Adjustable Cut-off Poppet Valve Engine, and Forced Iron Crank Shafts.

## "THE \$1,000 CHALLENGE"

### Ore Feeder for Quartz Mills.

OVER 750 ARE NOW IN USE, GIVING ENTIRE SATISFACTION.

Awarded First Premium at the Tenth and Twelfth Industrial Fairs of the Mechanics' Institute.

Twenty Per Cent. More Ore Crushed with Fifteen Per Cent. Less Wear of Iron than by Hand Feeding.

The accompanying cut illustrates the recently introduced Grip, and also the Spring Attachment, which replaces the Weight heretofore used, and which are obvious improvements.

It is now fully demonstrated, after careful and long continued experimentation and practical use, that the plan upon which a perfect Ore Feeder must be constructed is that of a carrier, and not that of a shaker. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Jerky or spasmodic contrivances will not answer the purpose for wet or sticky ores.

The Challenge Ore Feeders are now in Use in the following Mills, besides many others:

Sonsby.....	20	Stamp.....	Tuolumne county, Cal.
Sheep Ranch.....	20	"	"
Mahoney.....	40	"	"
Zelle.....	40	"	"
Placerville.....	40	"	"
Gross.....	50	"	"
Julian.....	50	"	"
St. Patrick.....	15	"	"
Providence.....	20	"	"
Omaha.....	10	"	"
Green Mountain.....	50	"	"
Plumas Eureka.....	60	"	"
Bulwer-Standard.....	30	"	"
Standard.....	20	"	"
Noonday.....	30	"	"
Bodie.....	10	"	"
Christy.....	5	"	"
Ontario.....	40	"	"
Contention.....	20	"	"
Grand Central.....	20	"	"
Harshaw.....	20	"	"
Sunshine.....	20	"	"
Homestake.....	200	"	"
Falher De Snek.....	20	"	"
Hidden Treasure.....	40	"	"

### Superiority of the "Challenge" Ore Feeder Demonstrated!

At the "Christy" Mill, Uintah County, Utah, the "Eclipse" Feeder, (conceived by E. Coleman) were introduced, but not carrying a regular supply of ore for the crushing capacity of the stamps, was replaced by the "Challenge," which are now running and the stamps crushing forty (40) per cent. more ore than was done by the "Eclipse."

The "Harshaw" or "Hermosa" Mill, of Patagonia District, Arizona, was also originally fitted with "Eclipse" Feeders, but after a few weeks trial they were pronounced inadequate to the work, discarded, and the "Challenge" adopted.

The "Silver King" Mill of Arizona, also removed the "Eclipse" Feeders to give place to the "Challenge."

The "Sola" Mill of Brown's Valley, Yuba County, Cal., was fitted with "Victor" Feeders, manufactured by E. T. Steen, but proving insufficient, the "Challenge" Feeders were substituted.

Four of the "Victor" Feeders, manufactured by E. T. Steen, were also placed in the "Alexander" Mill, at Gruntsville, Nevada, but after a fair trial were discarded, and Handy's Feeders fitted, and four others of the same pattern added when the second twenty stamps were erected.

These cases are simply cited from among many similar instances, in proof of the vast superiority of the "Challenge" Feeders over all others.

Mr. H. W. GREENWELL, of the Tingman Mine, El Dorado Co., or any other person can make \$1,000 by disproving the acknowledged superiority of my "CHALLENGE" Feeder, in a competitive trial, side by side, with any other Feeder, on wet or sticky ores from any mine, and I will give \$100 to any one who will procure the acceptance of this challenge, and arrange for a fair and impartial test on merit.

I mean business, Gentlemen, "either put up or shut up."

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Manufacturer of all descriptions of Quartz and Saw Mill Machinery. A Large Stock of both New and Second Hand at Machine Works. Nos. 49 and 51 Fremont Street, San Francisco.

Agent for "BAKERS" Rotary Pressure Blowers.



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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 15, 1881.

VOLUME XLII  
Number 3.

## Magnetic Separation of Ore.

A great many attempts, of various kinds, have been made for the treatment of ore by means of electrical or magnetic appliances. A great many thousands of dollars have been spent in perfecting the processes and carrying on the experiments, but so far none of them have been made practicable on a large scale, or have come into general use. Within the past two years these attempts have been renewed, and several inventors in this city have been working hard to accomplish something in this line. Two or three of them are still working away to attain their object before making their inventions public.

The process invented within the past few years, which has made the most noise and attracted the most attention is Edison's. When it was announced that a large company had been formed in Oroville, Butte county, in this State, to work black sands and "hydraulic gravel" by Edison's process, everybody waited expectant to see results. It was then stated that this company were buying up mining ground here and there, which they intended to work by this process. And we were told that the California miners lost too much in their tailings (which we knew before), and that these tailings were to be worked over by the new machine at a great profit. Immense beds of tailings were said to have been bought up by the men who had secured the Edison magnetic ore separator.

It is now over a year since all this happened, but we have not been called upon to chronicle any great work having been done. We have frequently been asked what results had been accomplished, and we printed a few weeks ago a request for information on the subject. We gave some months since a brief description of the principles of Mr. Edison's apparatus, but now give a full description, which will be of interest to our readers.

The device is intended for the separation of the magnetic iron sand from tailings in placer diggings and hydraulic mines. It would seem somewhat impracticable, to say the least, to put any very large quantity through one machine, and it would take a good many to work the tailings of any one hydraulic mine.

In order to separate the magnetic from the non-magnetic particles, Mr. Edison arranges a hopper for feeding the sands or pulverized material, a magnet, and a receptacle for the substances, in such relation to each other that the trajectory of falling magnetic substances is altered, the magnetic and non-magnetic substances falling into different receptacles.

One method by which the process may be applied is as follows: A hopper, preferably provided with an adjustable valve orifice, and arranged to feed the mingled substance in a thin, broad stream, is supported in any suitable way several feet (more or less) above a bin, which is partly immediately under the feeding orifice of the hopper, so that material falling from the hopper would, under normal conditions, fall therein. Between the hopper and the bin, and to one side of the straight line connecting the two is a magnet having a polar extension, whose face is of a length equal to the width of the feeding orifice of the hopper. Underneath the magnet and by the side of the bin, is another bin for the reception of the magnetic substances. This part of the device can be arranged, of course, in any other convenient way.

The material fell from the hopper tends to fall in a straight line. As it rises, however, within the influence of the magnet, the magnetic portions are attracted thereby and move toward the magnet, which is so placed with relation to the falling material that it cannot be attracted entirely to the magnet before gravity has carried it past. In other words, the trajectories of the falling magnetic substance is altered, it moving for a portion of its fall in a line, which is the resultant of two forces—gravity and magnetism—acting upon it.

We have prepared engravings of Mr. Edison's apparatus, as arranged by himself, for carrying his invention into effect. Fig. 1 shows it partly in elevation, partly in section. Fig. 2 shows it submerged in water.

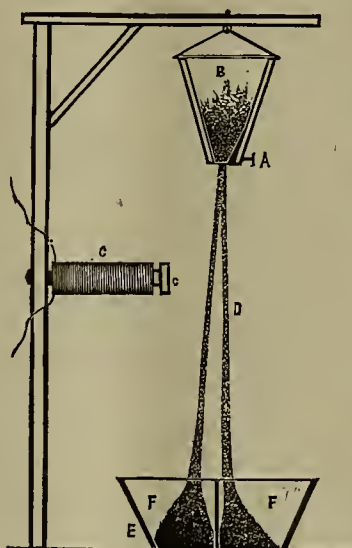
To any suitable support or frame work is attached a hopper, B, provided with a flat valve, B, adjusted by a screw, A, for regulating the thickness of the sheet of issuing material; a magnet, C, is supported below the hopper in any

suitable way. This magnet is provided with an extended polar face, c, of a length equal to the width of the feeding orifice of the hopper.

The polar face, c, is at one side of the line which the material would assume by force of gravity in falling from the hopper. This magnet, c, is connected by wires to a battery, generator or any suitable source of electricity. Beneath the hopper and magnet are the bins, as shown.

Supposing now the hopper to be filled with material partly magnetic, partly non-magnetic, the material infalling would, by force of gravity, fall as shown at F. The magnetic portions, however, are attracted toward magnet, c, but before they are brought over out of their path sufficiently to touch and cling to the pole, c, gravity

Fig. 1.



EDISON'S MAGNETIC ORE SEPARATOR.

has carried them past, and they fall as shown at F.

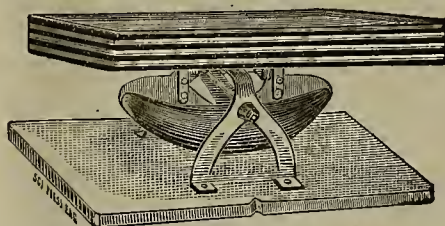
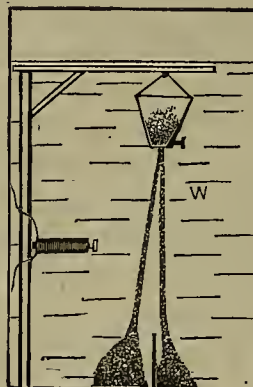
Instead of a magnet or magnets on one side, a magnet or magnets on both sides of the falling stream may be used, in which case the non-magnetic particles will fall in the center, the magnetic particles being drawn to one side or

side with its polar face extending through the side of the tank.

Our readers can see from the somewhat extended description the means and apparatus by which Mr. Edison was to work the tailings from our hydraulic mines, and can judge for themselves as to the practicability of any such device in this connection.

ALEXANDER AGASSIZ, curator of the museum of Natural History at Cambridge, Mass., has given not less than \$230,000 to that institution since 1871, beside making numerous gifts and subscriptions to other departments of Harvard University. Personally, says a writer in the *Harvard Register*, Mr. Agassiz is a bright, in-

Fig. 2.



HUSTON'S PATENT SHIPS' BERTH.

Few men at 45 years old are so full of vigor, or show more reserved vitality. Mr. Agassiz laid the foundation of his fortune by developing the famous Calumet and Hecla copper mines in the Lake Superior region.

SILVER REEF, UTAH.—The total bullion shipments of Silver Reef for the month of December footed up \$82,485.29, making a total shipment for the year 1880 of \$1,086,359.19, and a grand total shipment for the camp of \$3,800,502.96. The wise men of the schools, who not only declared it improbable that silver could exist in sandstone, but also asserted that it was impossible, can put the above in their pipes and smoke it.

THE furnaces at Clipper Gap, Placer county, are expected to begin melting ores in May. Their capacity is 40 tons a day. The ores are claimed to be of excellent quality.

## A Self-Leveling Ship's Berth.

Several contrivances have been designed for the purpose of alleviating the sufferings of those who are subject, when at sea, to attacks of the dreaded *mal de mer*, but none have afforded the much desired immunity from sea-sickness. Most of the appliances introduced to prevent sea-sickness have failed, either because they would not act at all, or, when they did, produced effects that were as bad as, if not worse than the malady. These contrivances have consisted of some modification of "swinging," but the roll of the vessel has not been even effectually lessened in its disagreeable effects by this method. There are many persons who are of so peculiar a temperament that the mere rocking of a boat induces nausea, while others can enjoy a channel yachting trip in rough weather without the slightest fear of those disagreeable sensations that have been so often described, yet fail to give even a scant notion of what sea-sickness really is.

It has been stated that "the immortal Nelson," among many others, although his profession necessitated a life afloat, was a martyr to sea-sickness, while many who have resided chiefly in country districts find nothing but enjoyment in a sea voyage, and can cross the channel when half a gale is blowing, without the least apprehension of unpleasant consequences. Among the many methods introduced that profess to afford relief are belts, medicaments, nostrums and devices, each and all of which have proved to be ineffectual.

It is necessary, in referring to the remedy, to consider the cause. The oscillation and rolling of a ship at sea tend to upset the normal condition of the individual, which, were it not for the particular tumbling action of the vessel, would not be affected. The invention to which we direct attention removes the cause, the result being that the effects are not felt, and hence the "Huston" berth is a "boon and a blessing." The peculiarity of this contrivance lies in the application of what is known as the universal joint, upon which the berth is poised, and is directed in its motion by a crescent-shaped weight, thus securing a perfectly level surface, no matter at what angle the vessel may pitch and roll. It is also controlled and regulated by india-rubber springs, preventing any tendency to jump up with a sudden jerk, and is strictly a "self-leveling berth." It occupies no more space than an ordinary berth, requires no expensive setting or adjustment, interferes in no way with the present sleeping arrangement on board ship, and can at once, if desired, be transformed into a fixed berth. Admitting the fact that sea-sickness is caused by the sufferer being forced by the law of gravitation out of his normal position, the inventor of the "Huston" self-leveling berth has adopted the universal joint principle, and thus enables a passenger to maintain a horizontal situation without being influenced by the motion of the vessel.

We see by the *British Trade Journal* that experience has proved that the invention affords relief and comfort, practical men and passengers have testified to the successful application of a most simple principle. The inventor has received numerous testimonials from persons expressing gratitude for the relief afforded. Among them is one from a private gentleman who recently took passage from Rio de Janeiro to New York in the steamship *City of Paris*. The writer, it would appear, had heard of the "Huston" berth, but had some doubts about its efficiency. His scepticism was dispelled, for he writes:—"This is a large steamer of 3,500 tons, handsomely fitted, and plenty of ice for cooling drinks. We have two cabins adjoining, and, strange to say, they are both fitted with Huston's patent berths, in which we feel very comfortable as the motion is scarcely perceptible."

THE new May Lundy mill, Mono county, has five stamps, 25 ft. of silver plates, blankets, clean-up pans, and the tailings are saved in a reservoir for future working. Of the 200 tons already worked, the yield has averaged \$65 per ton, and the proceeds are considered incomplete.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

### Amador County Mines.

EDITORS PRESS:—Plymouth is a mining town situated in a beautiful valley, or "plateau," sloping gradually to the southwest. The Empire mine is located near the center of the town and is the second mine in the county, in importance. This mine was first located by Simpson & Aden, in 1851. It is a fissure vein of gold-bearing quartz, and is supposed to be on the great "Vetro Madre," in which lie some of the richest quartz mines in the State. Two large hoisting engines are kept steadily running to supply the 80-stamp mill, which is propelled by water. Immediately south of this mine lies the "Pacific," under the control of the "Mining King," Alvin Hayward. This mine is just being developed. A large sum of money has been expended in putting up the latest improved machinery, now nearly complete. A large mill for reducing and extracting the ores will be erected next spring. Near 200 men are steadily employed in these two mines. The Alpine mine lies north adjoining the Empire. This mine is supplied with steam hoisting works and a 10-stamp mill, but has lain idle for five or six years. Some extremely rich ore was taken from this mine in 1862, by Wheeler & Hooper. X.

### Legislative Committees.

We append the names of members of the various committees of the Senate and Assembly, in order that our readers may know the individuals to whom bills are referred when sent to committee.

#### Senate.

Agriculture—West, Harlan, Burt, Langford, Glascock, Rowell, Hill, Carlock.  
Claims—Traylor, Davis, Enos, Post, West, Carlock, Zuck.  
Commerce and Navigation—Dickinson, Traylor, Nye, George, Ryan.  
Contingent Expenses and Mileage—Zuck, Carlock, Moreland, Nelson, Byrnes.  
Corporations—Sears, Johnson, Harlan, Kelly, Traylor, West, Pool, Brown, Dickinson.  
County and Township Governments.—Wendell, Rowell, Zuck, Satterwhite, West, Nye, Moreland.  
Education—Davis, Watson, Hill, Baker, Moreland, Conger, Johnson.  
Engrossed Bills—George, Carlock, Lampson, Nelson, Glascock, Kane.  
Enrolled Bills—Hudson, Burt, Anderson, Chase, Kelly, Gorman.  
Federal Relations—Baker, Cheney, Davis, Enos, Satterwhite.  
Finance—Pardee, Johnson, Traylor, Carlock, Brown, Conger, Ryan.  
Hospitals—Lampson, Hndson, Anderson, Gorman, Rowell.  
Judiciary—Wendell, Hittell, Johnson, Davis, Dickson, Satterwhite, Moreland, Enos, Cheney, Baker.  
Military Affairs—Dickinson, Pardee, Conger, Glascock, Nelson, Hndson, Hittell.  
Mines and Mining—Neuman, Watson Burt, Pool, Ryan, George.  
Public Buildings—Baker, Hill, Harlan, Kelly, Traylor, Johnson.  
Swamp and Overflowed Lands—Johnston Brown, Glascock, Cheney, Langford.  
Public Morals—Burt, Chase, Johnston.  
Public Printing—Hill, Rowell, Gorman.  
Roads and Highways—Byrnes, Burt, Harlan, Langford, Kane, Enos.  
Irrigation, Water Rights and Drainage—Johnson, Watson, Rowell, Neuman, Brown, Pool, Satterwhite, Davis, Chase.  
Fisheries and Game—Carlock, Pardee, Wendell, Cheney, Glascock.  
Electors—Cheney, Sears, Johnson, Zuck, Ryan, Anderson, Satterwhite.  
City, City and County and Town Government—Hittell, Dickinson, Pardee, Zuck, Chase, Enos, Sears.  
Chinese and Chinese Immigration—Hill, Burt, George, Kane, Anderson, Gorman, Conger.  
Labor and Capital—Conger, Watson, Carlock, Enos, Chase.  
Apportionment—Johnson, Hittell, Zuck, Wendell, Burt, West, Moreland, Enos, Chase.  
Assembly.  
Agriculture—Chandler, McMurray, Kilburn, Swift, Camron, Hinshaw, Alvise.  
Agriculture, Mining and Mechanical Arts—Kilburn, Gavigan, Wood, J. E. Baker, Branch, Lewis, Joseph Wasson, McDonald.  
Attaches and Employees—J. B. Patterson, F. E. Baker, Paulk, Alvise, Howard.  
Chinese Immigration and Emigration—Coleman, Patterson, Estey, Platt, Long, McCallion, Wentz, Lane, Pinder.  
Claims—Patterson, Sargent, Siebe, Young, Gilmore, Cunningham, Lane.  
Commerce and Navigation—Siebe, Wentz, O'Connor, Edwards, McCallion.  
Corporations—Felton, Arick, Garrity, Kilburn, Young, Brown, Bost, Edwards, Keating.

Counties and County Boundaries—Hendricks, Mudgett, J. E. Baker, J. H. Mathews, Fraser, Swift, Lewis, Hinshaw.

County Governments—Young, Felton, Jackson, Camron, Wood, Wersthaugher, Cunningham, Gavigan, F. E. Baker.

The Culture and Improvement of Grape Vines—Wentz, Fraser, Garrity, Hartson, Crank, Hinsbaw, Leake.

Education—Hoitt, Griffith, Platt, Geary, Milton, Wasson, Hendricks, Reynolds.

Elections—Reddick, Gilmore, Geary, Holden, Mein, Patterson, Streeter.

Engrossment—Mein, Edwards, Jones, Leake, Keating.

Enrollment—Warkins, Coleman, Estey, Burns, W. P. Mathews.

Fish and Game—Estey, Streeter, Crumpton, Leake, Mudgett, Warkins, J. B. Patterson.

Federal Relations—Jones, Jackson, Hendricks, McMurray, Murphy, Hitson, Joseph Wasson.

Yosemite Big Trees and Forestry—Van Fleet, Reddick, Milton, Wasson, Griffith, Birney.

Homesteads and Land Monopoly—Alvise, Birney, Coleman, Wersthaugher, J. E. Baker, McCallion, J. H. Mathews.

Indian Affairs—Wood, Keating, Mudgett, Coleman, Milton, Wasson.

Internal Improvements—Wersthaugher, Kilburn, Crank, J. H. Mathews, Samuels.

Irrigation—Streeter, Griffith, Murphy, Crank, Branch, Patterson, Felton, Hendricks, Arrick.

Judiciary—McClure, Del Valle, Van Fleet, Platt, F. E. Baker, Freer, Arrick, Jones, Hale, Long, Reynolds, Reddick, Kellogg.

Labor and Capital—Paulk, Siebe, Lane, Noonan, O'Connor, Wentz, Jones, Patterson, Swift.

Military Affairs—Van Fleet, Howard, Leach, Noonan, Brown.

Mileage—Mason, Branch, Wein.

Mines and Mining Interests—Joseph Wasson, Daggett, Warkins, Kellogg, Wein, Wood, McMurray.

Public Buildings and Grounds—Gay, Samuels, Brown, Chandler, Wersthaugher, McDonald, Pinder.

Public Expenditures and Accounts—Crank, Fraser, Burns, Patterson, W. P. Mathews.

Public Lands—Sargent, Holden, Jackson, Cunningham, Bost, Leach, Paulk, Gay, Lester.

Public Morals—Reynolds, Hale, Hoitt, Mathews, J. H. Crumpton.

Public Printing—Leach, Mason, Camron, Gavigan, Pinder, Gay, Binney.

Retrenchment—M. Wasson, Mason, Reddick, Whipple, Del Valle.

Roads and Highways—Long, Samuels, Warkins, Geary, J. Wasson.

Rules—Fraser, Holden, Daggett, McClure, Sargent.

State Hospital—Lewis, May, Crumpton, W. P. Mathews, Leach.

State Library—Hale, Hoitt, Freer.

State Prison—Hartson, May, Freer.

Branch—Siebe, Howard, Fraser.

Swamp and Overflowed Land—Baker, J. E., Van Fleet, Chandler, Baker, F. E. May, Gavigan, Sargent, Arrick, Bost.

Ways and Means—May, Felton, Brown, Hoit, Daggett, Noonan, Murphy, Howard, Hartson.

Water Rights and Drainage—Brown, Chandler, Felton, Hale, Kellogg, Burns, O'Connor, Young, Long.

Apportionment—Camron, McClure, Whipple, Paulk, Streeter, Gilmore, Bost, Daggett, May.

Municipal Affairs—Edwards, Whipple, Del Valle, Garrity, Van Fleet, McDonald, McClure, Mason, Lewis.

OUT ON ROCK CREEK.—We paid a hurried visit this week to the mine and works of the Auburn and Rock Creek mining company, located on Rock Creek, about three miles north of Auburn. Since our last visit, some two months ago, this company has done a great deal of work, and of a kind which indicates unmistakably that they mean business. Where men were then engaged in grading down the bank, a new 12-stamp mill now stands all ready, barring a few minor details, for operation. This mill is driven by an overshot wheel 32 ft. in diameter—one of the best in the county. It is supplied with pans and other appliances for saving gold, and in general details is the equal of any mill of its size that we have seen in this part of the country. While this mill has been building the mining operations have not been neglected. A force has been engaged all the time extending the levels and taking out ore, until at present there are over 300 tons on the dump ready to be crushed as soon as the mill is started up, which will not be later than next week. The mill is built near the shaft and hoisting works, and the arrangements are such that the rock is dumped from the car near the batteries, avoiding the expense of further handling or hauling. The ledge averages about seven ft. in width, and from such a body rock can be taken very fast. It is the intention to keep the mill going steadily when once fairly started. The 300 tons on the dump is mostly from the 130 level, and it is estimated that it will yield not less than \$20 per ton. The building of this mill and the general fitting up of the works have been done under the immediate supervision of Mr. P. M. Bowen, the president of the company.—*Placer Herald*.

### The Clays in the Comstock Lode.

At the last meeting of the San Francisco Microscopical Society a paper on the above subject, by Mr. Melville Atwood, of Sausalito, was read by Mr. Hanks.

As a preliminary to a statement of the results of my examination of the Comstock clays, I wish to say that I firmly believe that had the clays of the Comstock been carefully studied years ago, by the information obtained from that source, much time, and large sums of money, might have been saved in the discovery of the different large and rich ore bodies, and that even at this time a knowledge may be gained in that way which would greatly assist in directing the search for fresh or undiscovered deposits. For those in charge of the mines to acquire a correct knowledge of the character of the enclosing rocks of the lode, and the true condition of the mineralized silver and gold in the lode, would appear absolutely necessary for the successful extraction and milling of the different ores. There are comparatively inexpensive means of obtaining information, but nevertheless of the greatest importance. For instance, we frequently hear of rich strikes of "green chlorides" in some of the mines. Now, if such ore was really met with, the treatment of it in milling by "wet stamping" would be attended with the same results as that of wet stamping "black copper ore"—the loss of the greater portion of it. It does not appear very creditable, that after 20 years of mining and milling on the Comstock, that there are not wanting those who hold that a large portion of the gold found in the lode exists in a mineralized condition. Indeed, the way, so far as I can understand, in which they estimate their

### Loss on Treatment at the Comstock Mills.

Greatly favors that idea—the result of the cleaning of the mortars not being added to the battery pulp assays, so that they do not obtain a fair return of the gold contents of the vein-stuff under treatment, and consequently cannot correctly estimate their loss. At the different California quartz mills, a large proportion of the gold is usually found in cleaning out the mortars; so much so, that not long ago, at one of the mills in Mono county, it was found necessary to make use of a small bar and sledge hammer to loosen the gold, which had accumulated in such quantities in their mortars.

In the Virginia part of the lode, as late as May, 1859, and before the discovery of silver in that portion of the ground, the cradlings from the croppings of the lode were pounded in mortars with mercury, and the amalgam so obtained, when retorted, was, I am informed, sold for from \$6 to \$8 per ounce. The gold can now, by the aid of a batea, be washed out from the ore taken from the deepest workings: No. 1—Specimen of Comstock ore, with gold from the croppings of the Mexican mine, taken out of Comstock rocker June 22d, 1859. No. 2—Comstock ore, with gold from the fifth gallery of the Ophir mine. No. 3—Comstock ore taken from the deep workings of the Consolidated Virginia mine. No. 4—Gold mounted on slide, which was panned from a small quantity of No. 3 ore. The Comstock gold is very much alloyed with silver, and consists, of gold, 55.37; silver, 44.93. The clays of the Comstock are found on the foot, and what is called the banging walls of the lode, and from the "sides" of the rich ore bodies met with in the different branch ore fissures, also occupying the upper portions of such fissures or rents where there is no ore except the small rounded pieces mixed with it. It is very evident that the clays were formed subsequent to the quartz-heated waters acting upon and decomposing parts of the enclosing rocks, and the rounded character of some quartz-vein-stuff and country rock, met with in the clays, was the result of the mechanical wearing from the movement of the beated waters. The rounded pebbles of quartz with ore in them are found in such positions that they must have been brought up from greater depths. The same may be said of the pieces of country rock, which in many cases were not the same as that "cheeking them," or at the same level. The clays which I examined were taken from my private collection. Unfortunately, I had not any from the foot-wall.

### The way in which I made the

#### Examination of the Clays

Was first to place them in a porcelain dish, pouring hot water over and keeping them in the water for several hours, stirring occasionally till all the particles that would dissolve were taken up by the water. Afterwards I emptied the contents of the porcelain dish into a batea, allowing every thing that was dissolved to float away. By the batea the pyritic matter and other heavy bodies were separated from the rest of the coarser, rounded and lighter fragments of vein-stuff and country rock. The pyritic matter is then tested for gold, silver and tellurium, and also a microscopic examination of it is made under water. The fragments of country rock and vein-stuff are then washed again, using a brush to rid them of any clay that might still adhere to them. After drying they are put into a separator, having sieves with 30, 50 and 100 holes to the linear inch—a uniform size enabling me to examine them better with the microscope. The fragments that pass through the sieve having 100 holes, I place in a small cell, fastened on the glass slide and filled with water, which I cover with thin glass—the shape of the fragments are seen much better in this way, since by slightly moving the thin glass cover, they can be made to turn and exhibit

their forms in different directions. From the larger pieces of rounded

### Country Rock Met With in the Clay.

I cut sections. No. 5 is one of them, cut from a piece of about 4.10 of an inch in diameter, and which I send for your inspection. The rock from which it was broken is a trachytic diorite with a grayish-green groundmass of plagioclasic feldspar. It is rich in minute black particles of magnetite. Some of the hornblende is of an emerald green color, slightly fibrous. There also appears to be little patches of what is called "viridite." The feldspar in this rock has comparatively undergone very little alteration. Nos. 6 and 7 are sections taken from the enclosing east and west rocks of one of the richest ore bodies yet met with on the Comstock. You will see that they are of the same character, and as little altered as that found in a rounded state in the clays. This fact of the trachytic-diorite being found to the east and west of the ore body, and the absence of what is called the "black dykes" goes far to prove, if any proof is needed, that the richest ore bodies of the Comstock, for the most part only occupy portions of branch fissures, and are not usually met with in the main fissure. I have noticed that rocks on the Comstock which have undergone the greatest amount of alteration, and in which the feldspar is highly kaolinized are those where the planes in the jointed structure are of an open character, allowing the heated vapors from greater depths to rise through them; I find that with the exception of some of the larger grains being rounded, that apparently no change has taken place in the iron pyrites during the decomposition of the rocks, of which it formed a small part.

### The Clays Contain

On an average about 2% of pyritic matter, about the same proportion as that in the rock before decomposition; the pyrites in some instances give a small return of gold and silver. The magnetite found mixed with the pyrites after panning, I separate by placing the whole in water, and then making use of a small bar magnet. The fine sand which passed through the sieve having 100 holes to the square inch, contains a large proportion of quartz, and also small calcareous granules mixed with the undecomposed feldspar. The fragments of quartz are much corroded. I very much regret my want of adequate optical apparatus, which prevented my making as thorough an examination of the Comstock clays as I could have wished.

### Mine Examinations

So many of our society are more or less interested in the examination of mines, must plead my excuse, if any be needed, for calling your attention to a little device, which I have lately used with very satisfactory results in my underground examinations. The want of sufficient light has always been felt, and was a great drawback in our underground examination. In England large-sized candles were purposely made for the use of the underground superintendents. A great deal of skill and practice are required in the management of the candle underground, and by that means the close observer will easily distinguish between the "expert" and the practical miner. The candle is generally carried in the left hand, and the right is used to shade the eyes from the light. My device is a small glass reflector, one of which I submit for your inspection. It fits the hollow of the right hand, and by holding the candle before it with the left, a strong light may be thrown at pleasure in any direction, and to a considerable distance, enabling you to see the roof of the drift and cross-cuts and slopes which you otherwise would not be able to examine. I carry the reflector in a small pocket in the right-hand side of my underground coat.

### Tioga District.

This district lies 35 miles south of Bodie, on the summit of the Sierra Nevada mountains, and at the head of Bloody canyon, partly in Mono and partly in Tiolumne county, and is equidistant (110 miles) from Modesto and Oakdale, the nearest railroad points. The district was located by Eugene Bauharnais Burdick, a mining man well-known throughout California and Nevada, October 18, 1878, since which time some 500 claims have been located. The mineral belt and veins (which are very large) have a general northeast and southwest course, the mineral belt extending from Mount Dana to Mount Gibbs, a distance of three miles, and the veins having an easterly dip of about 90 degrees. The west country rock is granite, with a porphyry gangue, and the east country is syenite, the metal being chiefly silver in the sulphuret form. A chain of beautiful lakes, linked by living streams, spreads over the district, and the timber is large and everywhere distributed. The ledges are very large, being all the way from 10 to 200 ft. in width. The principal locations on the Mount Dana end of the belt are the Mount Dana, Ahmego, Bevan, Burdick Zahriske or Lake, Tiptop, Chief of Tioga, Austin, Mount Lyell and Yellow Jacket, while the locations on the Mount Gibbs end considered of the greatest value are the Faith, White Horse, R. A. Sawyer, Yosemite, Kanawah, Mount Dana No. 2, Enterprise, Helena, Lucky Jack and Golden Crown. Work is being actively prosecuted on the Mount Dana and others and will be kept up all winter, ample supplies having been laid in and comfortable quarters erected for the miners.—*Free Press*.



## MECHANICAL PROGRESS.

## The Reese Fusing Disc.

We gave, some weeks since, a brief notice of the above named device, which is in reality "an apparatus for cutting cold steel by a current of air." It appears that the device has attracted considerable attention abroad, and that the editor of the London *Engineer* has written to the inventor, Mr. Reese, of Pittsburg, Pa., for an explanation of the principle and operation of the machine, which is given in the *American Manufacturer* as follows:

"At first glance the machine seems to resemble a cold saw, but its action has nothing in common with that of the saw. It is well known that a disc of soft iron, caused to revolve at a very high velocity, will cut a hard piece of steel through, if the steel be brought in contact with the edge; but the Reese disc, it is said, fuses a bar of steel across without touching the bar."

"This machine consists of a disc of soft steel, 3-16 inches thick and 42 inches in diameter, and making about 230 revolutions per minute, which give an angular velocity of 2,500 ft. per minute. The bar to be cut must be round, and it is placed in the chuck in front of the disc, and caused to make about 200 revolutions per minute in the same direction as the disc; that is to say, the edge of the disc and the surface of the bar move in opposite directions. Thus adjusted, the disc not touching the bar, but close to it, a round bar of steel, 1½ in diameter, can be fused in two or ten seconds, the appearance of the cut, and the position of the disc with regard to it and the bar, being shown in the engraving. A, representing the round bar partially cut in two by the revolving disc, B, turning on its axis, C.



"It should be observed that the disc is only 3-16 inches thick, while the groove fused in the bar is 5-16 inches wide, leaving 1-16 inches of play at each side, and ½ inches clearance in front. 'We have,' writes Mr. Reese, 'adjusted the disc mandril on center, and satisfied ourselves that no lateral motion took place, and yet the air space always existed. The ends cut show no signs having been touched by the disc; the result of the fusion is metal, and the molten metal, while running down, may be handled by the naked hand without detecting but little temperature. The ends of the bar operated on become heated; the disc remains perfectly cool.' It must be understood that the phenomena that we have described are only present when the bar to be cut is caused to revolve. If the bar is not turned, the disc cuts its way through it as a cold saw would, but the discharge from the cut is not metallic, but an oxide of iron. The use of the fusing disc is, therefore, confined to round steel bars of moderate diameter."

"It is very difficult to explain the phenomena in question on any hypothesis consistent with our existing knowledge of molecular physics. That a bar of steel, caused to revolve close to the edge of a disc running a very high velocity, should be fused without contact taking place between the two, is a wonderful fact, which may stimulate the energies of ingenious minds for a solution for some time to come. Mr. Reese's explanation is that the fusion is due to the transfer of the mechanical energy stored by the air in the air flying from its rim into heat. The explanation is best given in his own words: 'The disc is surrounded with an atmosphere of air at a pressure, say 15 lbs. to the square inch. This air, by virtue of the motion of the disc, is thrown outward in radial lines, and is projected from the periphery. Temperature being the measure of molecular velocity, as weight is the measure of matter, it follows that the increased velocity acquired by the air in passing off the disc, will indicate a large increase of caloric. A part of this is drawn from the disc, which is thus kept cool, the remainder is obtained from the atmosphere. The increase of heat is not sensible, as it is occluded—latent—by the distended condition of the molecules. When the air is thrown off of the periphery of the disc, it tends to follow—or a portion of it—the disc, as our atmosphere follows the earth, the bar of metal impeding the flow of the air around the disc, the impact condenses the air, retards its velocity, unlocks the occluded heat, and fusion takes place. At the instant fusion takes place the molecular velocity of the metal is so suddenly increased, and is so great, that it possesses no sensible caloric above the atmosphere, all the balance being occluded; and as no occluded caloric can be unlocked except by reduction of the molecular velocity, the metal is,

therefore, apparently cold, though in a molten state. The more experience I obtain the more strongly am I impressed that the imponderable physical agents are the prime factors or all the chemical and physical phenomena we observe, and that physics should be more earnestly studied.

"Mr. Reese is a metallurgist of some standing, but it is not quite easy to follow him, or to extract his meaning from the passage which we have quoted; yet, on examination, it will, we think, become intelligible. If we conceive the disc to project a constant shower of particles of solid matter against a surface, it is clear that that surface would soon be raised in temperature, for the same reason that a wire becomes hot when hammered; and that the molecules of a gas are able to play this part is also known; but when we have got thus far we are left face to face with an aspect of the problem which Mr. Reese has not attempted to solve. Why should it be essential that the bar to be cut should be round and that it should revolve in the same direction as the disc? There appears to be no connection whatever between the revolution of the bar and its fusion. We shall, for the present, make no attempt to offer an explanation of the cause of the phenomena, because we are not as yet in possession of a sufficient number of facts. The explanation that at first presents itself is that fusion of a portion of the bar is set up at first by the disc coming in contact with it, and that the steel thus melted is burned by the air current, and that, in fact, the bar is burned through. It is well known that a small bar of rod iron, such as a nailrod, may, if heated to a bright red, be made white hot by blowing on it with a pair of smith's bellows. But if the bar were burned through, the discharge from the cut would be oxide of iron, whereas it is, according to Mr. Reese, metallic iron or steel. But when the bar to be cut does not revolve, then the discharge is oxide of iron."

**ANNEALING STEEL.**—There is much carelessness, says an exchange, in annealing steel articles which are to be wrought, and much trouble occurs from not properly softening steel before it is given to the bench workmen, the lathe man or the planer. There is a little of true cast steel that has any life in it that can be properly annealed by a heating in a forge fire, taking it out and holding it in the shadow, and then plunging it in water when it ceases to glow. It is poor steel that will not contract hardness when thus treated. When it is considered that a spring temper is so low that the amount of heat by Fahrenheit will give 579°, and that this heat will show no glow in the shade, it will be seen that this method of water annealing is not reliable. When a piece to be annealed has been heated to a red it should not be exposed to the air a moment, but be plunged into a bed of fine cinders, air-slacked lime or charcoal powder. The last is the best, and a dry bath of mingled lime and charcoal particles gives excellent results. There the piece should be left until entirely cold, or until the hand can bear its heat, and even then it is best to cool it in water.

**A NEW ELECTRIC MOTOR.**—Mr. William W. Griecorn is the inventor of a new electric motor which he exhibited before the Franklin Institute some time since. Its leading feature is the field magnet, which is made semicircular, so that all the magnetic lines of force are brought into the best possible position for effecting the revolution of the magnetic armature through which the current produced by a battery is sent. A small model weighing 2½ lbs. was attached to a sewing machine and a battery of six cells, each containing one plate of zinc four inches long and two inches wide. Dr. Norris, of the Franklin Institute, states that the machine did both light and heavy work, and the speed was under complete control. The battery was sensibly constant, showing no signs of polarization. The current was estimated at two webers per second and the force generated at 1,000 foot pounds.

**PUDDLING OF IRON.**—Mr. E. Harris, the President of the South Staffordshire Mill and Forge Managers' Association, in a paper which he had just read before the institute on the puddling of iron, said that the schemes tried to prevent smoke, save fuel, etc., might be counted by scores, but none of the recipes had been so effective as to secure a general adoption. It was a mistake theory to suppose that because iron was fibrous in the puddled bar it would be fibrous in the finished bar. Often enough the puddled bar was crystallized, and no matter how many times this class of iron was worked over again, fibers could not be developed. The "hot short" iron was as much to be guarded against as the "cold short," for while the engineer in constructing a bridge or building a vessel dreaded the "cold short" iron, the blacksmith and the hollermaker equally feared the "hot short."

**EXTERNAL CORROSION OF BOILERS.**—Reports of the Manchester association for the inspection of steam boilers show that many explosions are traceable directly to external corrosion, caused by damp or "sweat" formed between the walls in which the boilers are set. From this it appears that however important it may be to examine the interior of boilers, it is also of vital importance to investigate the outside, especially those parts which are either in immediate contact with the setting walls, or so covered by them as to prevent thorough ventilation,

## SCIENTIFIC PROGRESS.

## Atmospheric Ozone.

We find in the *American Chemical Journal* a highly interesting abstract of certain arguments advanced by Schoene, a German chemist of eminence, which seem to indicate that the proofs hitherto relied on to demonstrate the occurrence of ozone in the air are fallacious. For many years the presence of ozone in the air has been regarded as satisfactorily answered; the influence exerted by ozone upon those who breathe it has been very fully discussed; and innumerable observations have been made to determine the amount of ozone in the air. In the face of all this, it is somewhat of a shock to find that a chemist of the acknowledged eminence of Schoene should at this late day question the proofs which have hitherto been adduced for the purpose of demonstrating the presence of ozone in the air.

Nevertheless, Schoene feels himself warranted in making the assertion that "as yet we possess no chemical reaction by means of which we can prove the existence of ozone in the air." The proofs hitherto relied on for this purpose are substantially the following reactions: 1. Something in the air sets iodine free from potassium iodide and caustic potassa are formed. 2. Papers saturated with a solution of manganese sulphate are turned brown in consequence of the formation of manganese sesquioxide. 3. Thallium suboxide is oxidized to thallium oxide.

Bat Schoene's investigations have shown that these changes of potassium iodide and thallium suboxide can be as readily effected by hydrogen peroxide as by ozone; and hence that these reactions by no means prove the presence of ozone in the air. So also the change of manganese sulphate does not require the presence of ozone, as it is brought about by air free from ozone, in which a trace of carbonate of ammonia is present; and as this last-named substance is normally present in the air, the proof based on the change of the manganese sulphate papers loses its value. Other proofs that have been advanced are based on the supposed absence of hydrogen peroxide; but as this substance has been shown to be present in the air, they are worthless.

Schoene holds that the only reagent by means of which the existence of atmospheric ozone can be positively proved is metallic silver. But neither Schoene nor Houszau nor Andrews, to whom we are chiefly indebted for investigations respecting atmospheric ozone, have ever noticed a blackening of silver in normal air free from sulphur compounds; and Schoene reports that he has been unable to detect more than the slightest change in the color of silver-foil exposed for long periods to the action of the air.

Referring to the supposed formation of ozone during thunder-storms, Schoene asserts that the odor of the air noticeable under these circumstances is not that of ozone; and he farther questions the probability of the formation of ozone by lightning, since, as he urges, the electric spark in a mixture of oxygen and nitrogen causes the formation only of hyponitric acid, while the silent discharge is necessary for the formation of ozone.

It must not be inferred from the above array of objections, that Schoene denies that ozone may be present in the air. Such is not the case, his object being simply to show that at present we possess no valid proof.

**VOLCANIC THUNDER STORMS.**—A paper on volcanic thunder storms, by M. Faye, was read before the French Academy of Sciences on Nov. 2d. It is stated that in paroxysmal eruptions the enormous amount of steam ejected causes volcanic thunder storms, which are very different from ordinary thunder storms. The volcanic storm has no gyratory movement; it is confined to the column of ascending clouds, and no flashes occur without the presence of ashes. Altogether, the phenomena resemble very closely those of the Armstrong electric machine. As observers have failed to mention any hail attending these thunder storms, it is probably because no hail is formed. Its absence is due, M. Faye thinks, to the lack of gyratory motion already noticed.

**SHORT-SIGHTEDNESS.**—From the inquiries conducted by Prof. Hermann Cohn, of Breslau, since 1855, it appears that short-sightedness is rarely or never born with those subject to it, and is almost always the result of strains sustained by the eye during study in early youth. Myopia, as it is called, is seldom found among pupils of village schools, and its frequency increases in proportion to the demand made upon the eye, in higher schools and in colleges. A better construction of school-desks, an improved typography of text books, and a sufficient lighting of class-rooms, are the remedies proposed to avert this malady.

**A NOVEL BAROMETER.**—A very cheap weather glass is described by an old sportsman, that surpasses the most delicate barometers. In a corner of a room in his house he has carefully protected an epider's web. When the insect shortens the threads which suspend the web, rain and wind may be expected; if reefs be let out, fine weather is certain; if the spider remain inert, rain may be expected. The epider makes up its house every 24 hours; if this operation takes place in the evening, a fine night and a beautiful morrow may be prognosticated.

## The Genesis of the Ores of Iron.

Prof. J. S. Newberry, in the *School of Mines*, quarterly for November, 1880, says that iron ore deposits, including those of the Archæan, are shown by Dr. Newberry to be of sedimentary origin, and their formation through the aid of organic acids is sustained. Speaking of the Archæan iron ores, he says: "That in some cases the ore has been profoundly modified, both in character and position, since its deposition, is undeniable; but to be asked to believe that the ore sheets are intrusive is a greater strain upon my credulity than it can endure."

The magnetite and hematite ores in southern Utah, which Prof. Newberry was the first to describe, are situated 300 miles south of Salt Lake City, in what is really the prolongation of the Wahatch mountains. He observes that near Iron Springs, the so-called "Big Blow out" is a projecting mass of magnetite iron ore, measuring probably 1,000 ft. by 500, rising in castellated crags 100 ft. or more above its base. The Blair mine is a ragged black crest of magnetite, 200 to 300 ft. high. The ore of the region, which is half hematite, is in belts extending nearly vertical; it is often intersected by thin layers of quartz, or jasper, and occasionally by zones of crystals (two to three inches long) of apatite. The containing rock is granite, of a finer kind than that of the Wahatch axis; "some of the ore beds are interstratified with the granite, and are certainly, like it, metamorphosed sediments," as is well seen at the Blair mine. Prof. Newberry states that no eruptive iron ore exists in the Rocky mountains, and that in the opinion of Prof. Otto Torell, Director of the Geological Survey of Sweden, the ores of Sweden are metamorphic and not eruptive.

**THE KANSAS CITY REVIEW OF SCIENCE AND INDUSTRY.**—edited by T. S. Case, is a monthly "Record of progress in science, mechanic arts and literature," and aims to be "an exponent of Western thought and a means of communication of Western discoveries and theories." The December number contains the proceedings of the Kansas Academy of Science, and, in a briefer form, those of the St. Louis Academy of Science. It is published at Kansas City, Mo., in monthly numbers of 64 pages each.

**THE NOVEMBER METEORS.**—European observers of the November meteors, during the nights of Nov. 12-14th, think they obtained evidence of the increasing density of the Leonid-stream, thus confirming observations made last year in England and the United States. One of these meteors appeared larger than the planet Jupiter, with an intense blue light, and a bright train of the same color.

**THE PRISM DEVICE.**—Dr. Copeland, at Duanecht, while searching the heavens by the aid of Prof. Pickering's prism device, recently described in these columns, for introduction between the eye piece and objective of a telescope, discovered a small planetary nebula. Without this aid the discovery could not have been made.

**COPPER IN THE HUMAN SYSTEM.**—The normal occurrence of copper, in appreciable quantity, in the animal economy is well known. Quite recently, according to *Science*, Dr. W. Hadelich, of what place we are not informed, has detected and determined the presence of that metal in the soil of a church yard, and in portions of exhumed bodies.

**LUMINOUS GAS.**—Prof. E. Niedemann, in his investigation of the behavior of gases under the influence of electrical discharge, has arrived at a confirmation of a fact previously given by him. That a gas may be rendered luminous by electric discharges without any corresponding elevation of temperature.

**PROCEEDINGS OF THE ACADEMY OF SCIENCES OF PHILADELPHIA.**—For the convenience of those interested in mineralogy and geology, the papers of the proceedings of this academy in these departments for the years 1877-79, have been issued as a separate pamphlet, and made No. 1 of a proposed series.

**A PATENT HAS BEEN GRANTED FOR AN ELECTROMAGNETIC ROCK-DRILL.** A drilling tool is directly attached to the core of axial magnet and arranged to impart to said core a reciprocating motion. The current is shifted alternately to the coils.

**LONG DISTANCE TELEPHONES.**—It is stated that a company has been formed for long distance telephone service between New York and Albany, Saratoga, Buffalo, Port Jarvis and points in Connecticut, Massachusetts and Vermont.

**ALCOHOL AND ACETIC ACID,** says J. Bechamp, are constant and necessary products of putrefaction. He has discovered alcohol also in small quantities in normal and sound animal tissues.

**A FOSSIL BONANZA.**—Quite a bonanza in the shape of fossil pachydermata and carnivora has been found in the Thames valley, especially near Taplow.

**THE BLOOD IN A MOSQUITO.**—So slow is the digestion of the mosquito that when the insect has dined on a human being, it continues for 48 hours to exhibit human blood corpuscles.



Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Dec. 25.	Week Ending Dec. 30.	Week Ending Jan. 6.	Week Ending Jan. 13.
Alpha.....	4	32.70	31	2.90
Alta.....	4.85	2.95	2.65	1.05
Andes.....	1.90	1.65	1.90	1.60
Argenta.....	25c	15c	20c	25c
Atlantic.....	50	50	50	50
Aurora Tunnel.....	21	1.80	1.60	1.40
Belcher.....	10	10	10	10
Belmont.....	10	10	10	10
Best & Belcher.....	94	84	91	84
Bullion.....	1.45	1.30	1.40	1.15
Budget.....	90	75	75	65
Belle Isle.....	50	45	50	35
Bodie.....	50	60	60	50
Benton.....	1.45	95c	85c	60c
Bulwer.....	10	10	10	10
Butte.....	10	10	10	10
Black Hawk.....	10	10	10	10
Belvidere.....	10	10	10	10
Booker.....	160	160	160	160
Calaveras.....	1.60	1.55	1.60	1.15
Challenge.....	70c	60c	70c	1.70
Chollar.....	2.80	2.40	2.35	1.70
Confidence.....	20c	15c	20c	15c
Con Imperial.....	2.20	2.10	2.15	1.90
Con Virginia.....	1.20	1.10	80c	90c
Crown Point.....	1.20	1.10	80c	90c
Con Washoe.....	75c	60c	45c	1.85c
Champion.....	10	10	10	10
Concordia.....	10	10	10	10
Dayton.....	10	10	10	10
DeFrees.....	10	10	10	10
Danby.....	10	10	10	10
Day.....	10	10	10	10
Europa.....	10	10	10	10
Exchequer.....	1.10	1.35	1.20	1.30
Endowment.....	10	10	10	10
Gen Thomas.....	1.20	1.10	80c	90c
Grand Prize.....	1.20	1.10	80c	90c
Gila.....	10	10	10	10
Golden Chariot.....	10	10	10	10
Golden Terra.....	10	10	10	10
Goodrich.....	10	10	10	10
Gould & Curry.....	3.45	4.20	3.90	3.45
Hale & Norcross.....	4.90	60	50	3.80
Hillside.....	10	10	10	10
Highbridge.....	10	10	10	10
Honesty.....	10	10	10	10
Hussey.....	10	10	10	10
Independence.....	40c	30c	30c	20c
Julia.....	30c	25c	15c	15c
Justice.....	1.70	80c	35c	40c
Jackson.....	25c	30c	25c	25c
Joe Scates.....	10	10	10	10
K K Con.....	1.20	1.10	80c	90c
Kentucky.....	10	10	10	10
Kosuth.....	10	10	10	10
Keynote.....	10	10	10	10
Lady Bryan.....	25c	20c	15c	10c
Lady Wash.....	25c	20c	15c	10c
Leopard.....	10	10	10	10
Leviathan.....	10	10	10	10
Leeds.....	10	10	10	10
Lee.....	10	10	10	10
May Belle.....	10	10	10	10
Modoc.....	1.60	1.90	1.70	2.95
Manhattan.....	90c	1.00	1.00	1.00
Martin White.....	10	10	10	10
McClintock.....	10	10	10	10
Meadow Valley.....	10	10	10	10
Mexico.....	10	10	10	10
Middle.....	10	10	10	10
Morning Star.....	10	10	10	10
North Con Virginia.....	10	10	10	10
New York.....	10	10	10	10
Northern Belle.....	10	10	10	10
New Coso.....	10	10	10	10
Navajo.....	10	10	10	10
Occidental.....	1.20	1.05	85c	1.55
Opifer.....	70c	60c	60c	50c
Oriental.....	10	10	10	10
Overman.....	65c	50c	35c	35c
Panther.....	10	10	10	10
Phenix.....	10	10	10	10
Phil Sheridan.....	10	10	10	10
Potosi.....	1.35	1.65	1.70	1.15
Prospect.....	10	10	10	10
Raymond & Ely.....	10	10	10	10
Richer.....	10	10	10	10
Rock Island.....	10	10	10	10
Rye Patch.....	10	10	10	10
Rough & Ready.....	10	10	10	10
Savage.....	20	20	1.95	1.35
Sag Harbor.....	10	10	10	10
Sierra Nevada.....	90c	75c	90c	75c
Silver Hill.....	50c	35c	40c	35c
Silver King.....	1.40	1.35	1.40	1.35
Silver Prize.....	10	10	10	10
Succor.....	10	10	10	10
Summit.....	10	10	10	10
Scorpion.....	1.35	1.10	1.30	1.40
Solid Silver.....	10	10	10	10
South Bodie.....	10	10	10	10
South Standard.....	10	10	10	10
St. Louis.....	10	10	10	10
Syndicate.....	10	10	10	10
Toga Con.....	10	10	10	10
Tiptop.....	10	10	10	10
Trojan.....	10	10	10	10
Union Con.....	10	10	10	10
Utah.....	10	10	10	10
Vermont Con.....	10	10	10	10
Ward.....	10	10	10	10
Wells Fargo.....	10	10	10	10
Woodville.....	10	10	10	10
White Cloud.....	10	10	10	10
Yellow Jacket.....	3.30	2.85	2.45	2.15

Sales at S. F. Stock Exchange.

Wed. A.M. Jan. 13.		85	Utah.....	70c
210 Alta.....	1.85	40	Union.....	50c
100 Andes.....	1.30	40	Yellow Jacket.....	2.20
70 B & Belcher.....	1.80	AFTERNOON SESSION.		
125 Belcher.....	1.05	1100	Argenta.....	45c
300 Bullion.....	1.15	75	Bodie.....	85c
50 Con Imperial.....	2.20	100	Boston.....	85c
160 Con Virginia.....	2.20	610	Champion.....	60c
10 California.....	1.30	125	Concordia.....	95c
20 Chollar.....	1.90	300	Day.....	15c
300 Crown Point.....	65c	10	Europa Con.....	15c
100 Caledonia.....	25c	200	Grand Prize.....	1.45
400 Gould & Curry.....	3.40	120	Goodshaw.....	90c
2670 Hale & Norcross.....	3.65	190	Head Center.....	20
450 Julia.....	40c	10	McClintock.....	20
100 Justice.....	45c	10	Mt Diablo.....	3.45
50 Kentucky.....	1.10	10	Mt Potosi.....	30c
30 Mexican.....	1.10	125	Modoc.....	10
240 Ophir.....	80c	700	Nevada.....	10
110 Overman.....	75c	50	Northern Belle.....	90c
40 Occidental.....	1.10	100	Noonday.....	95c
70 Potosi.....	1.40	100	Noonday.....	95c
385 Savage.....	1.40	100	Overman.....	30c
55 Sierra Nevada.....	70c	150	Silver King.....	1.15
55 Scorpion.....	1.15	20	Syndicate.....	55c
470 Silver Hill.....	30c	20	Toga Con.....	55c

**BIG PAPERS.**—The Sacramento Record-Union, San Francisco Chronicle and MINING AND SCIENTIFIC PRESS are each and severally deserving the highest praise for their big and really valuable holiday editions, and uniform excellence at all times.—*Ingo Independent.*

**THERE** is only one Humbug mining district, and that is in Arizona. But there are a good many humbug mining companies, and they are not by any means all in Arizona. You can only find them out by seeing a greater anxiety to sell stock than to work the mine.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

## ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.	
Alta M Co	Nevada	19	50	Jan 6	Feb 10	Mar 2	W H Watson	302 Montgomery st
Bullion M Co	Nevada	17	50	Dec 14	Jan 17	Feb 7	J M Brazell	325 Montgomery st
Belmont M Co	Nevada	27	10	Dec 13	Jan 24	Feb 21	J W Pew	310 Pine st
Belvidere M Co	Cal	9	50	Dec 7	Jan 10	Jan 29	C W Hubbard	310 Pine st
Bechtel M Co	Cal	7	15	Dec 3	Jan 10	Jan 31	W H Leut	309 Montgomery st
Bullion M Co	Nevada	17	50	Dec 14	Jan 17	Feb 7	J M Brazell	325 Montgomery st
Caledonia M Co	Nevada	33	25	Dec 14	Jan 17	Feb 7	J M Brazell	325 Montgomery st
Golden Fleece M Co	California	19	30	Dec 19	Jan 22	Feb 12	F S Shneider	755 Folsom st
Crown Point M Co	Nevada	44	50	Dec 28	Feb 2	Feb 23	J M Nevada	327 Pine st
Excelsior Deep Gravel M Co	Cal	14	25	Dec 28	Jan 29	Feb 14	D B Chisholm	327 Pine st
Harrington M Co	California	2	25	Dec 28	Feb 3	Mar 2	C O Miller	324 Pine st
Hale & Norcross M Co	Nevada	67	75	Dec 3	Jan 13	Feb 7	J F Lightner	Montgomery st
Head Center M Co	Arizona	11	30	Dec 21	Jan 21	Feb 25	J W Pew	310 Pine st
Leeds M Co	Utah	3	15	Nov 16	Dec 27	Jan 25	D B Chisholm	327 Pine st
Julia M Co	California	14	30	Dec 15	Jan 20	Feb 1	H A Charles	410 California st
Julia Con M Co	Nevada	13	20	Dec 15	Jan 20	Feb 1	H L Charles	419 California st
Jackson M Co	Nevada	13	20	Nov 23	Dec 27	Jan 7	C M Shaw	408 California st
Mackey M Co	Nevada	5	26	Nor 23	Dec 30	Jan 24	J M Buntington	309 Montgomery st
Mono G M Co	California	10	50	Dec 28	Feb 2	Feb 23	W H Leut	309 Montgomery st
Overman M Co	Nevada	48	50	Dec 2	Jan 6	Jan 27	G D Edwards	414 California st
Potosi M Co	Nevada	5	50	Dec 10	Jan 14	Feb 5	W E Dean	309 Montgomery st
Spaulding M Co	California	1	10	Dec 17	Feb 15	Feb 15	J H Hein	117 Battery st
Swamp Angel M Co	Nevada	2	07	Jan 10	Feb 16	Mar 8	C W Badger	320 Sansome st
Sierra Nevada M Co	Nevada	67	107	Jan 7	Feb 10	Feb 23	E L Parker	309 Montgomery st
Tellurium M Co	California	24	10	Dec 3	Jan 5	Feb 23	J M Litchfield	425 Montgomery st
Original Gold Hill M Co	Nev	9	10	Nov 29	Jan 5	Feb 7	J M Buntington	309 California st
Toga M Co	Cal	12	15	Nov 30	Jan 4	Jan 24	W H Leut	309 Montgomery st
Utah Extensional M Co	Nevada	1	20	Nov 26	Dec 27	Jan 20	V Ressayre	120 Sutter st
Yellow Jacket M Co	Nevada	40	100	Jan 4	Feb 8	Mar 18	M Oley	Gold Hill

## OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Argenta M Co	Nevada	6	10	Nov 20	Dec 22	Jan 12	E M Hall	327 Pine st
Commonwealth Con M Co	Cal	4	10	Nov 12	Feb 14	Mar 8	Chas A Morse	217 Sansome st
Columbia Smelting M Co	California	1	10	Dec 15	Feb 2	Mar 27	D Maracovich	405 California st
Dudley M Co	Cal	11	10	Dec 7	Jan 10	Feb 3	E O Masten	309 Montgomery st
Equitable Tunnel M Co	Utah	24	15	Dec 31	Feb 8	Mar 5	C J Collins	227 Montgomery st
Eagle S M Co	Cal	15	10	Nov 15	Dec 15	Jan 15	J E Byrne	533 Kearny st
El Tesoro M Co	Lower Cal	9	25	Dec 6	Dec 15	Feb 8	W H Chickering	214 Sansome st
Flower M Co	Nevada	4	10	Dec 16	Jan 20	Feb 10	W W Stetson	309 Montgomery st
Hillside M Co	Nevada	4	100	Dec 17	Jan 21	Feb 14	F Frankenthal	cor Battery & Cal st
Golden Chariot M Co	California	11	25	Dec 19	Jan 12	Jan 31	E C Masten	309 Montgomery st
Martha White M Co	Nevada	8	25	Dec 17	Jan 26	Feb 23	J J Scoville	309 Montgomery st
Maryland Con G & S M Co	Cal	2	25	Aug 10	Dec 20	Jan 14	E P Farneworth	202 Sansome st
Mayhew Con M Co	Cal	6	10	Dec 3	Jan 14	Feb 10	W J Taylor	310 Pine st
Merchant M Co	Cal	15	15	Dec 4	Jan 3	Feb 2	S D Rodgers	Safe Deposit Bldg
Mount Auburn M Co	California	3	50	Nov 24	Dec 24	Jan 24	J F Newell	330 Pine st
Norfolk M Co	Nevada	5	15	Dec 14	Jan 3	Feb 2	S D Rodgers	Safe Deposit Bldg
Norfolk M Co	Nevada	7	20	Dec 11	Jan 17	Feb 8	E M Hall	327 Pine st
Oro M Co	Cal	6	10	Nov 15	Dec 18	Jan 13	Wm Stuart	320 Sansome st
Pittsburg M Co	California	8	10	Dec 1	Jan 6	Jan 27	R Wagoner	414 California st
Pioneer Silver Belle M Co	Arizona	1	04	Dec 3	Jan 13	Jan 24	N T Wesser	232 Montgomery st
Red Cloud Con M Co	Cal	15	Dec 3	Jan 13	Jan 13	Feb 13	W J Taylor	310 Pine st
Rowe M Co	Arizona	2	03	Dec 22	Jan 22	Feb 21	S D Rodgers	328 Montgomery st
Rocky Point S M Co	California	5	05	Jan 10	Feb 7	Feb 23	W G Hughes	330 Pine st
South Bulwer M Co	California	8	25	Dec 9	Jan 10	Feb 2	W Stewart	320 Sansome st
Utah S M Co	Nevada	33	200	Jan 7	Feb 9	Feb 23	G C Pratt	309 Montgomery st

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Aurora Tunnel M Co	Nevada	C V Hubbard	310 Pine st	Annual	Jan 17
California M Co	Nevada	C P Gordon	309 Montgomery st	Annual	Jan 13
Gila River M Co	Arizona	W W Parrish	330 Pine st	Annual	Jan 19
Kosuth M Co	California	E F Stone	306 Pine st	Annual	Jan 17
Pocahontas G M Co	California	A Staples	113 Leidesdorff st	Special	Jan 19
Sierra Nevada M Co	Nevada	E L Parker	309 Montgomery st	Annual	Jan 19
Wide Awake M Co	California	O Hildebrandt	235 Sutter st	Annual	Feb 9

## LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Dec 30
Indian Queen M Co	—	Grove Adams	Merchants' Ex	10	Oct 26
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine st	10	Oct 30
Northern Belle M Co	Cal	Wm Willis	309 Montgomery st	50	Dec 16
Northern Belle M Co	Cal	J Nash	315 California st	25	Jan 15
Standard Con M Co (2)	California	Wm Willis	309 Montgomery st	75	Jan 15
Western M Co	California	O S Curtiss	303 Montgomery st	76	Dec 10

## The Mining Share Market.



North Star, Bower and Munz mines, owned by Eastern capitalists, will now be energetically worked. The Greenwood seam belt promises, at no distant day, to be one of the most prosperous mining camps in the State.

#### MONO.

**MAY LUNDY BULLION.**—*Free Press*, Jan. 6: We saw a bar of May Lundy bullion Wednesday, and it was a beauty. Its weight was about 20 lbs, quite yellow in color, its value being about \$16 per ounce, or \$4,700 for the bar. The Lundyites swear that the May Lundy is the biggest mine in the world, and we believe that it will prove itself a big mine, if not the biggest, next year.

#### MENDOCINO.

**NEW GOLD MINES.**—*Dispatch*, Jan. 7: From present indications it will not be necessary much longer for the people of this section of the State to go elsewhere to seek wealth in mining operations. In addition to the gold mines at Hopland and Capella, a new field, rich in deposits of gold, has been discovered near this place. As evidence of the truth of this assertion, Mr. Robert Hildreth left at this office, on Wednesday, a small vial containing 21 small specks of the precious metal, the result of washing 1 pan of dirt. The mines just discovered are located 24 miles east of Ukiah, in the hills back of William Hildreth's place, and are said to be quite extensive. Black sand predominates in the formation in that section, and the gold is said to be in the sand. Scientific experiments made to demonstrate the value of this new field.

#### NEVADA.

**WYOMING MINE.**—*Nevada Transcript*, Jan. 4: By a slide of earth and stones from the great dump at the Wyoming company, the putting of a new one and causing some delay. In making the necessary repairs, precautions have been taken to provide against future accidents of the kind. Four more Frue concentrators have been put into the mill, making in all 8 of those useful machines in use there. The property is said to have very encouraging prospects.

**THE MOUNTAIN MILL.**—The building for the new mill of the Mountain Mill Co., on Deer creek, is being rapidly put up under the superintendence of Mr. Weisenburger and another gentleman whose name is not stated. The machinery will be put in and started in crushing as soon as practicable. The opinion prevails among mining men that with good management the Mountain mill will prove a successful enterprise.

**A FINE YIELD.**—*Herald*, Jan. 11: Eight tons of rock taken from A. C. Gillespie's mine, situated at Old Butte, had been crushed at Southern's mill, Grass Valley, and gave a total yield of \$425 or \$53 per ton.

**SCOTIA MINE.**—*Free Land*, Jan. 12: From present indications, we should say that the Scotia mine will soon be one of the dividend payers of this town. They have struck a ledge in the bottom of the shaft and all the rock looks well, while some of it is of extraordinary good quality, being filled with mineral and rich in free gold. Mr. Walter Stoddard, the superintendent, has pushed the work ahead as rapidly as possible, in order to take all possible advantage of the winter season, and they are now prepared to go ahead with the work in spite of any storms which may come. A station is being made at the 200 level, and when that is completed rock will be taken out for milling and the shaft will be sunk for the 300 level. Miners who are judges of ore inform us that they consider the prospect at the Scotia a most excellent one and can see no reason why it should not be a most valuable property. The rock assays well up in the hundreds.

**PEABODY MINE.**—*Grass Valley Union*, Jan. 12: The Oakland M. Co., which is working the Peabody quartz claim, on Rhode Island ravine, have been engaged for several weeks in re-opening the old drain tunnel to draw off the surface water which interfered with sinking the new shaft. This drain tunnel was badly caved by the rotting of the timbers, and it was almost like making a new tunnel. On last Friday night, when the drain was opened within 100 ft of the shaft, the water broke through, and for a time made things quite lively for the workmen. The water came in with such a sudden rush that all the lights were extinguished, and one of the men was washed through the tunnel a distance of 40 ft before he was able to get a hold upon the timbers and save himself. The men had a big scare for a while, but the water soon subsided. The water in the shaft, which previously had been under great pressure, was drained out, and the bottom, a depth between 40 and 50 ft, which enabled work to be resumed in sinking, and in a few days the shaft will be in firm ground, and the extraction of quartz will be commenced. The drain tunnel will carry off all the surface water, which heretofore has been a great obstacle in sinking the shaft.

#### PLACER.

**MINE TRANSFER.**—*Times*, Jan. 8: Mr. John P. Hickey, of San Francisco, and sole owner of all the Cedar Creek company's mines and ditches, has bought out the remaining interests in the Wisconsin mine, he having had several shares before. This claim has now passed into the hands of a man who will proceed to work it in conjunction with the Baker mine. Mr. Hickey has been in Dutch Flat for some days past, and is personally superintending the opening of work in the Baker, Dutch Flat canyon and the Gold Run claim. Mr. Hickey is one of the heaviest individual mine owners in this section.

**HUNT BY A BLAST.**—Tuesday of last week Phil. Bailey was seriously hurt in the Morgan mine, at Lowell Hill, by the discharge of a blast in the tunnel. He had set off a bomb, but after waiting some time he found that the fuse had not come out, went into the tunnel to relight it. When he had come up to examine the cause of the failure of the explosion of the blast, it went off. Most of the charge went into his face. He was badly burned about the face and it was thought both eyes would be lost, but we learn that one eye can be saved, with a possibility of preserving the sight of the other.

**BEAR DAM.**—*Herald*, Jan. 8: This last summer F. Birdsall, of the Bear River ditch, expended considerable money in putting in a dam and some undercurrents at a certain point on Bear river nearly opposite Colfax. A week ago yesterday some party or parties, as the report goes, went to the dam, drove the watchman away, and at once blew up the dam with giant powder. The damage, fortunately, was only nominal.

#### PLUMAS.

**GOLD STRIKE.**—*Greenville Bulletin*, Jan. 7: The Kerr tunnel prospects more favorably than ever. Twenty-four stamps are in constant operation, and all the work progresses favorably.

**PLUMAS NATIONAL.**—In consequence of the non arrival of the acids the new furnace of the Plumas National cannot start for a few days. There are now estimated at from \$30,000 to \$40,000 worth of sulphuric acid on hand, ready to be worked as soon as the acids arrive, which are now on the way from Reno.

**SOUTHERN EUREKA CON.**—The wood work on the new mill is all completed except laying the floor, which will be done as soon as all the machinery from the Greenville Iron works is in. In a short time will elapse ere the mill will be ready for active operation. The work on the lower tunnel is being pushed forward rapidly, and when the mill is ready the ore from this tunnel will be run on cars directly into the mill.

**GREEN MOUNTAIN.**—On the 1st instant this company shipped the finest single bar of gold bullion which ever went out of this mining district, valued at between \$12,000 and \$15,000, the result of a run of 13 days. The new mill is running splendidly, and as no delays are anticipated the run will doubtless be continued for the month. The new pipe across the McClellan ravine is now firmly anchored and the water successfully passing through. Should more water be required, and the ditch enlarged, the pipe will be amply sufficient, as it will carry 3 times the present capacity of the ditch.

#### SIERRA.

**KEYSTONS.**—*Mountain Messenger*, Jan. 8: Fifteen men are steadily employed at this mine. A large amount of rock has been taken out which will average at least \$15 per ton. It is expected that a clean-up of at least \$15,000 will be made in the spring. There is no perceptible decrease of the richness of the rock.

Very soft rock was struck Dec. 27th, by the Haskell Peak company, and the tunnel can be driven in it for about \$2.00 per ft.

**SUSPENDED.**—Work has been suspended on the Forest Queen ledge, but will be resumed in the spring.

**ENCOURAGING.**—The 1001 gravel company, above Sierra City, is steadily driving its main tunnel, and is now in better looking gravel than has ever been seen before in this section.

**BLACK GRAVEL.**—On Friday of last week the B. M. Extension mining company struck fine black gravel in their tunnel, at Forest City. Whether or not a channel has been struck, is a question to be determined by further exploration. So far as developed the gravel is of a deep blue color, carrying wallo quartz boulders well water-worn. Everything indicates a heavy wash. The tunnel is now in about 3,200 ft, and will be pushed forward as rapidly as possible. Gravel was first encountered in the upper left-hand corner of the tunnel, and gravel boulders were seen on that side in less than 20 ft, and the indications are that the whole tunnel will be clear of the rim rock in a short distance. The tunnel is running due north, and appears to strike through the rim at an angle of about 45°. The bedrock appears to pitch northwest at about the same angle. Some little time will necessarily elapse before the full significance of the discovery can be determined.

#### TRINITY.

**NEW RIVER ITEMS.**—*Cor. Trinity Journal*, Jan. 8: The long-looked-for rain has come at last, and mining is fairly begun for the season; water is plentiful and of course everybody is happy over it. There are about the same number of men on the river this year as last. The Slide Creek company is pushing their claim to Messrs. Buckley & White. The last named gentleman was the Superintendent last season, so I judge he knows the claim well, as he has certainly had every opportunity of knowing. The Portuguese company, on Big flat, began ground-sluicing last Tuesday. They are fairly prepared for a good season's work, having been improving the claim all summer—blasting bedrock, enlarging their reservoir, etc. The contractors on the New River hydraulic mining company are working in good shape. The saw mill has been running over a month, and a steam whistle may now be heard on New River. They have a very nice and smooth-running mill, provided with double circular saws, 50 and 40 inches diameter respectively, 1 edging and 1 cut-off saw. As everything is now in running shape, it looks almost impossible that all this heavy machinery has been packed on mules over 50 or 60 miles of such trails as we have, and as to making anyone but a mountaineer believe it, that is not to be thought of. The heaviest piece of casting in the mill weighed nearly 500 lbs, and was certainly a nice load for a mule; yet old Sacramento, the packer, succeeded in delivering it without accident. The mill is running night and day, and Mr. Jackson has plenty to do to supply the logs. The dam is a splendid and very substantial structure, likely to stand any freshet. It is 275 ft long on top, about 230 at the bottom, and backs the water over a mile up the river. The loggers are now a mile or more above the mill, as all the timber within that distance has already been cut down. The graders and ditch diggers have passed Bell's flat, 21 miles below the dam.

#### NEVADA.

##### WASHOE DISTRICT.

**CALIFORNIA.**—*Gold Hill News*, Jan. 16: During the week there have been extracted and sent to the mills 305 tons of ore, assaying \$31.58. On the 2300 level the joint Ophir east crosscut has been advanced 39 ft, and the joint Con. Virginia east crosscut has been extended 20 ft. On the 2500 level the south drift from the Ophir line has been advanced 40 ft, and the joint Ophir upraise has been extended 14 ft.

**CON. IMPERIAL.**—We have been engaged during the week in putting a brick bulkhead in the south drift from bottom of south winze, 2135 level. Shall hereafter have about 3 inches less water to pump, which is shut off by this bulkhead, and our expenses for pumping will thereby be largely reduced.

**SIERRA NEVADA.**—On the 2300 level the upraise has been advanced 20 ft during the week, the highest being 20 ft. On the 2500 level the west crosscut has been advanced 24 ft; total length, 94 ft. During the week 93 tons and 200 lbs of ore have been extracted.

**MEXICAN.**—On the 2500 level the joint Ophir east winze has been extended 9 ft, and the 2000 station set put in place.

**OVERMAN.**—East drift, 2275 level, has been extended 46 ft through very hard rock; total length of drift, 122 ft. We are now putting air-pipe in winze and will have the air-pipe up to the face of drift by to-morrow morning. Forman shaft has been sunk and timbered 20 ft; total depth, 1,635 ft.

**CHOLLAR.**—The drift south on the 2400 level was advanced 63 ft. The material through which the drift is made is clay, porphyry and some quartz. The formation being soft and quite loose, were compelled to timber quite thoroughly to prevent caving. The face of the drift, as well as the 63-ft run, are dry.

**YELLOW JACKET.**—During the past week we have placed a switch on the line of the Suro tunnel and extended the drift north 48 ft from the same. The ground has been very hard. In the shaft we have the usual force employed repairing and changing pit work.

**SILVER HILL.**—The winze on the 1300 level has been sunk and timbered 15 ft during the past week. No other work has been done at this level, as the water has not been lowered. The bottom of the winze is now near quartzite. Very little water is coming in below tank No. 2, but there is plenty above it.

**OPHIR.**—On the 2500 level the joint Mexican east winze has been sunk and timbered 9 ft, and the 2000 station set put in place. Also, on the 2500 level, the west crosscut has been extended 14 ft, and the joint California upraise 14 ft.

**NEW VIRGINIA.**—During the past week there have been extracted and sent to the mills 1,107 tons of ore of the assay value of \$35.53. On the 2300 level the south lateral drift has been advanced 32 ft, and the joint California east crosscut 20 ft. During the week \$33,544.96 in bullion have been shipped.

**UNION CON.**—On the 2500 level the joint Mexican upraise has been extended 20 ft; the joint Mexican west crosscut 14 ft; the joint Mexican east crosscut 20 ft; and the joint Sierra Nevada crosscut 48 ft.

**CALZONITA.**—Pumps have run an average of 16 hours per day, consuming 6 2/3 cords of wood per day. Forman shaft has been sunk and timbered 20 ft; total depth, 1,035 ft. The rock still continues hard in bottom. Water remains same as at last report.

**UTAH.**—During the past week the work in the mine has progressed as usual. The east drift, on the 1950 level, is 150 ft distant from the 1850 level. The east drift on the 2150 level has been advanced during the week 22 ft.

**BULLION.**—East drift, 2340 level, is in 300 ft, and still in vein material, through which stringers of quartz pitch west to the foot. The east drift, 2450 level, has just reached the casing of the vein.

**SAVAGE.**—During the past week the usual repairs to the shaft and the incline below the 2000 level, and to the 2100 station have been made, and the 10th level drift has been driven ahead.

**HALE & NORCROSS.**—On the 2400 level the north lateral drift has been extended 68 ft. During the week 74 tons of ore, giving an average assay of \$45.63 per ton, were hoisted from the 2100 level.

**UNION SHAFT.**—The shaft has been sunk and timbered 10 ft. Are repairing the drift at the 1600 level, cutting out bob-pit at the 2200 level and easing timbers at the 2400 level.

**G. & C. AND B. & B. SHAFT.**—Have been engaged the past week in taking out pumps and column above the Suro tunnel.

**C. N. S. SHAFT.**—Putting up the big engine which is to run the hydraulic pumps.

**O. & C. SHAFT.**—The 2500 station set has been placed in position.

#### ELLSWORTH DISTRICT.

**MOUNT VERNON MINE.**—*Grantsville Bonanza*, Jan. 8: Work will soon be resumed on this valuable property by

a Chicago company and the work of development pushed as vigorously as capital and muscle can send it along; the ledge in this mine is well defined and carries high grade ore, there will be no trouble, it is thought, to extract sufficient of it to keep a mill running steadily. Ellsworth has long been under a cloud, but the day is not far distant when the Mount Vernon and other mines of that district will be adding to the bullion product of the world.

#### GRANTSVILLE DISTRICT.

**THE CENTENNIAL.**—*Bonanza*, Jan. 8: This mine, as work progresses, is proving to be one of the very best in the camp. The ore in the new shaft is of a high grade and still increasing in width as they sink on it, with today a new strata coming into the main body. Work has also commenced on Centennial ground south and west from new shaft on what is proving to be an immense chimney, and if present prospects continue ore will be hauled to the mill in a few days which will more than pay their expense account.

**THE ALEXANDER.**—The ore in the lower levels of the Alexander continues to improve in richness and extent. We were shown a piece of sulphuret ore on Thursday that ought to mill at least \$100 per ton. The ore below the lower level is much richer than that above, and enough of it can be easily extracted to keep 100 stamps pounding steadily for years.

**THE BROOKLYN.**—Work is being pushed steadily in this mine and very fine ore is encountered in the lower level. Twenty stamps of the Alexander mill are kept pounding away steadily on Brooklyn ore and the mine never looked better than at present.

#### SECRET CANYON DISTRICT.

**GOON SHOWING.**—*Eureka Sentinel*, Jan. 8: Capt. Foley brings "glad news" from Secret Canyon. The snow over there is from 2 to 4 ft deep, but the majority of the miners are well supplied with provisions and mining materials, and the snow does not interfere with them. The Holden mine operators are doing "glad work," drifting for their ore body. They will be forced to run 50 or more ft yet to tap the same, if the calculations and surveys are correct, but the drifting now being done is in favorable ledge matter. The Irish Ambassador ore vein is widening with every stroke of the pick, and its owners feel pleased with the present prospects. Doc Hamilton and L. D. Pope are at work on the Page & Corwin. Supt. Potter, of Pinto, is doing assessment work on the series of mines which he purchased from John Herch. In fact everyone in the canyon is at work, and they feel encouraged with the recent developments. The best of all is that the Geddes & Bertrand is to be started up, mine and mill, next week.

#### SILVER CANYON DISTRICT.

**STARTED UP.**—*White Pine News*, Jan. 8: From Mr. Chapman, who runs a stage from Schellbourn to Silver Canyon, we learn that Dr. Brooks' mill, at the latter place, started up on the 1st. After half a day consumed in trying the machinery and helting, everything was found to run smoothly and satisfactorily. The ore now being worked assays from \$100 to \$130 per ton. Eighteen men are at work in the mine, and 12 at the mill. Dr. Brooks has a ledge 2 1/2 miles long, and 1/2 mile wide, from Brown to Centerville, 4 miles distant, which will be brought in in pipes next spring. Should this supply prove insufficient, more can be had in the same vicinity. Silver Canyon has 2 flourishing saloons, and 1 large general store, conducted by Pujade & Oaraghan, of Ward. The town, though in its infancy, promises to have a bright future. It is 26 miles south of Cherry Creek. The scarcity of lumber is one of the greatest drawbacks the people there have to contend with at present.

#### SUNNYSIDE DISTRICT.

**NEW DISCOVERIES.**—*Grantsville Bonanza*, Jan. 8: Some new discoveries have recently been made in this district, in mines owned by Tom Ferrel, J. Holden and Frank McPherson, and by the latter, promising results. The Albany they have a ledge 2 1/2 miles long, and 1/2 mile wide, from \$127.33 to \$157.08 per ton. The ore from the Northern Belle goes \$61.33, that from the Lucky Jim, \$115.35, and the Damsite, \$106.93. This ore was not selected but taken out promiscuously. This district is situated near Walker lake, about 3 miles from the Bellville road, and will be within 25 miles of the Carson and Colorado railroad when it is completed. The owners of these mines are satisfied that they have a good property and intend to push work on them.

#### ARIZONA.

**RACKENBACK.**—*Gazette*, Jan. 8: Mr. Perdue, one of the owners of the Rackenback mine, informed us Monday that the shaft on that mine is now down about 170 ft, in very rich ore. The ledge continues to hold out in size, and seemingly improves in richness, as depth is reached. The mortgage on the property of the Rowe mining company will, he informs us, probably be foreclosed at the next meeting of our District Court, as the company is failing to make any payments on the same. The Carpenter Creek South and other mines in the district are all looking well.

**HUMBOLDT.**—We learn that the Buena Vista, Silver Lamp and Washington mines, in Humboldt district, have been bonded by their owners, Messrs. Farley & Kee, to Mr. Weber, the Superintendent of the Tipton mine, and another gentleman, for \$30,000. The bondholders have the privilege of sinking, drifting and tunneling on the mine for 4 months, to inform themselves of the character and richness of the mine, and they have already set a number of men at work on them.

**UPPER TONTO MINES.**—*Globe Chronicle*, Jan. 2: The late heavy rains afford a chance of testing the value of the gold placer claims on Wild Rye. The creeks are booming, and almost every gulch has a running stream. The Olden Wonder (Nash's mine) is looking remarkably well, and is likely to give splendid results, the assays by whom it is now being worked. The Excursion has 3 ft of good ore (gold) in the bottom of the shaft. James Moore's ledge, near the Excursion, is 6 ft in width at a depth of 16 ft. The croppings assay rich in gold, and like all other gold claims in the district, it retains its richness in going down. Messrs. Oowan, Hill & Co. are prosecuting work on their water wheel at the East Verde, Mr. Smith is about to start his arastra on Wild Rye creek on gold ore from the Gulch. Messrs. House & House are prosecuting work in their main tunnel, in which they have lately struck silver ore of good quality. The late rich strike in the Hornet mine of the Mazatzal company is attracting the attention of mining operators.

#### COLORADO.

**SOLD.**—*Mining Reporter*, Jan. 7: The Gold Wonder, on Old hill, in the suburbs of Lake, discovered by young Fisher while out hunting a few months ago, has been sold through Mr. Copelin to C. C. Alvord for \$110,000, and \$50,000 in hard cash have been paid to Beam and Fisher. Manager Funk, of the George Washington and Wonder mines, awarded the Washington contract to Roger's Bros., who have commenced work on the 50 ft contract on main tunnel. They are industrious and efficient. C. C. Alvord, the purchaser of the Gold Wonder, will place a stamp mill near the mine, at the springs, the spring, and work will be prosecuted on the mine at once.

**SHERMAN.**—Work on the Rebel Boy is progressing rapidly. Barker & Hill have finished about 30 ft of their contract and still have 20 ft to complete. Tunnel is in 72 ft in all, and the vein is becoming stronger every day. They now have a pay streak of about 2 ft, which is every inch in brittle silver. Robinson & Wager commenced work on the extension of the Black Wonder mine yesterday morning. They have very strong vein carrying sulphurets and brittle silver in large quantities.

#### IDAHO.

**ATLANTA.**—*Cor. Statesman*, Jan. 7: The Tahoma mine, owned by Pedlar & Davis, is working from 6 to 8 men, taking out quartz and having it crushed at the Buffalo mill. The ore is the best mine in Idaho, and at present is looking better than ever. The Monarch is being worked under the superintendence of Mr. Wm. H. Pettit, who is working about 13 men. They are also taking out rock and having it bailed to the Buffalo mill for crushing. The Last Chance mine is being worked. The Moly mine, owned by George Tims & Co., is working 3

men. R. B. Brown is working 12 men. He has completed his new quartz mill and will soon be able to give it a test. Supt. Gault, at the Tahoma, is not doing anything this winter, but as soon as the spring will permit, he will erect his new mill and set men at work in the mine here. He has any amount of good ore in sight.

**ROCKY BAR.**—Rocky Bar is looking better now than it has for a long time; the times are very good and everybody has money to spend. There is some work being done in the mines at this place. The Ada Ellmore is being worked; running levels and sinking. They are working some 12 or 15 men. The Vishnu is being worked by Kever & Suttle; they are working some 6 or 7 men. The Alturas mine, formerly owned by Thomas Johnson, now belonging to Eastern men, will start up in a short time. They will probably give employment to 6 or 7 men. The Bonaparte is not doing anything this winter, but will, most likely, start up in the spring.

#### MONTANA.

**CABLE.**—*New Northwest*, Jan. 2: It is a satisfaction to know work is progressing very favorably on the famous lead recognized and referred to for many years as giving the best promise of any in Montana. But a dozen or more years ago litigation began concerning it; it became the cause celebre of the Deer Lodge Court; work was practically suspended; the mine filled with water; the expense of operating it properly appeared too heavy for our home capitalists to venture; Montana miners were in bad repute abroad and so the Atlantic cable held its golden store, and the two quartz mills dependent thereon stood in almost uninterrupted silence through many years. In 1875 Judge Hubbard, of Cedar Rapids, and Mr. J. C. Savery, one of the owners, were making a pleasure trip through Montana. 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## Idaho Mining Districts.

The Virginia Enterprise has been permitted to make the following extracts from a letter to Dr. Delevan, of this city, from Dr. G. L. Lucas, dated Albion, Idaho, December 25th:

## Towns and Camps.

Bellevue is six miles above Emigrant crossing, on Big Wood river, and is the largest town on the river, but it has a rival in the newly laid out town of Heley, five or six miles up the stream, and opposite Croy's gulch. At this point Big Wood river is spanned by a new bridge, connecting the new town site with Mineral Hill district. At this point they are about to erect a smelter on the west bank of the river. The richest mineral in lower Wood river is within six miles of the place where the smelter will be erected.

About six miles northwest of Heley are the rich carbonate mines of Mineral Hill district. The chief of these is the Bullion. The vein is from 20 inches to 4 ft. in width, and the average value of the ore is \$200 per ton. The ore is 70% lead and 1% antimony, with a trace of arsenic. The gangue is hematite iron ore.

The Idahone, half a mile to the east of the Bullion, yields, clear of mining, sacking and hauling 175 miles to Kelton, thence by rail to Salt Lake City, \$100 per ton profit.

About six miles southwest of Heley are what are known as the Boyle mines—the Ohio, Ohio North, Trade Dollar, the Ornament, and many others. South from Boyle camp, Mr. Garrard and son, also F. Cammel, have a mine or mines of very rich ore. Mr. Garrard was private secretary to the late ex-Governor Bradley, of Nevada. Several mines at Boyle camp have changed hands at good figures, and much ore has been shipped out from that point.

There are rich mines at Croy's gulch, near Heley, as well as on Indian creek, say three or four miles east of Heley. A smelter is now at Kelton, Utah, waiting to be sent into or opposite Heley.

## On the East Fork

Of Big Wood river, end about half way between Heley and Ketchum, is the North Star mine, a large body of ore that does not assay so high as some, but what it lacks in quality it makes up in quantity. It was bonded in November for \$60,000, \$10,000 to be paid in 30 days, and \$50,000 in one year, the mine to be worked in the meantime, but the ore to be left on the dump until all the money is paid.

Ketchum is about 11 or 12 miles above Heley, on the east side of Big Wood river. About two end a half miles east of Ketchum, on Eagle creek, is the Elk Horn mine, for which \$12,000 was paid last summer. They have shipped to Salt Lake about 180 tons of ore that sold for \$130 to \$140 per ton.

## On Warm Spring Creek

The first discoveries were made by the Kelly brothers in May, 1879, as follows: West Fork, West Fork No. 2. It is a contact ledge with granite on one side and quartzite on the other. Both claims show from three to five ft. of galena ore averaging 100 oz. of silver to the ton. The Idaho, on Boyle mountains, assays from 60 to 300 oz. per ton.

The Erwin mine has the ledge exposed for 700 ft. by a series of shafts, open cuts and a tunnel. Ten and a half tons of ore shipped to Salt Lake from this mine sold for \$135 per ton, and there are 80 tons on the dump which will sample 130 oz.

The North Star, on Warm Spring creek, has shipped 10 tons and has 60 on the dump; Ontario has shipped 10 tons of first-class ore and has on the dump 300 tons of second class.

## Hot Springs.

Warm Spring creek rises near the head of the Smokey, runs east 25 miles through a dense forest of pine and fir timber and empties into Big Wood river, about half a mile above the town of Ketchum. About two miles up Warm Spring creek are what are known as Hot Springs. They are situated about 20 ft. above the bank of the creek. I took the temperature of five or six of the springs and found it to be about 162° Fahrenheit. There are about 150 inches of water when all is collected in one stream. Many are of the opinion that the springs are not only good for their medicinal virtues, but that they will also be of great use in connection with a smelter to keep water power from freezing in winter.

## Saw Tooth.

Galena City is about 25 to 28 miles above Ketchum, on the headwaters of the Big Wood river and on White Cloud, one of its tributaries. The mines, also at Saw Tooth, on the head of Salmon river and about 14 miles west of Galena City, are rich in free-milling ores—gold and silver. In and around Galena are the carbonate and galena ores of the richest character found anywhere on the Big Wood river. Wood is abundant, and plenty of water power is quite convenient. Timber for any and all purposes is plentiful, but grass is less abundant than at Ketchum, where 11 different kinds of grass grow wild, and as many kinds of timber trees, all good for the use of man.

Capitalists have made many fine investments in mines near Galena City and much work has been done, but I am not able to give names and particulars. A big smelter will be put up early next summer near Galena, and [at Saw Tooth one or more silver mills are soon to be erected. As they have mines very rich in free milling ores they will soon speak for themselves.

Work is progressing even now in winter at Saw Tooth and Galena. The miners are running tunnels, sinking shafts and the like. I am of the opinion that both Galena and Saw Tooth will be very lively camps next summer; probably more so than any of the mining camps on Big Wood river.

I am informed that 150 to 200 miners will find work at Saw Tooth mines, and 200 to 300 at Galena City next spring. Real prospecting will commence next spring on Big Wood river. Thus far only mines showing on the surface have been taken up, and I may say no deep cuts or tunnels have been run to search for blind ledges. The mineral belt is from 50 to 60 miles long and about half as many miles wide. There is an abundance of grass for stock, and neither oats nor barley is required during the spring and summer months.

## Prospecting.

Those who have been most successful in prospecting are men who made themselves acquainted with the kinds of country rock prevailing at points where rich ores had already been found, rather than go on knowledge previously acquired in California and Nevada. It is a noteworthy fact that the surroundings—quartz, quartzite, limestone, porphyry and granite—in which the ore is found differs very materially on the east and west sides of the Big Wood river. Most of the prospecting so far has been done on horseback, and many of the finds have been purely accidental.

## California Woolen Manufacture.

## The Golden Gate Woolen Mills.

The establishment of the Golden Gate Woolen mills marks an important era in the industrial progress of San Francisco. If the man who makes two blades of grass grow where one only was before springing up, so he, too, is deserving of consideration and esteem who utilizes raw products and by the inauguration of manufacturing enterprises adds to the wealth of the community. The Bulletin has the following article on the woolen manufacture of this city:

The manufacture of woolen goods was one of the first things in manufacturing attempted on this coast. Sagacious business men saw that while California was exporting largely the raw material and importing as extensively the manufactured article, the opportunity was afforded of utilizing the wool here and keeping at home large sums annually sent out of the country for woolsens of all descriptions. And from a comparatively humble start in San Francisco, there are to-day several woolen mills scattered up and down California, all finding a home market for the wool grower, and supplying employment in a greater or less degree to a large number of young people. The pioneer in this business was Donald McLennan, who has recently laid the foundation of what bids fair to be the most important enterprise of this character in the world, except the large woolen mills in the East and in Europe. But these manufacturing enterprises are not only valuable to a community as finding employment for the rising generation, and keeping at home large amounts that would be otherwise sent abroad, but they add greatly to the wealth and prosperity of the community in other ways. The owners of real estate are directly concerned in the establishment of manufactures. Every factory, however small and unpretentious, helps to make land more valuable in the city or town in which it is established. For this reason no person is more interested in making San Francisco the great manufacturing center of the Pacific coast than are those owning real estate within its limits. Every dollar invested in a local industry has a two-fold purpose. It not only brings back a return direct on the profits of the business, but it adds surely to the value of all the real estate in its immediate neighborhood. This is seen from the fact that communities frequently donate tracts of land for the location of factories, and the offers made to exempt from taxation enterprises of this character by municipalities. The people of Benicia recently gave a tract of land to a plow company, under the idea, of course, that it will pay them by drawing population, and so making the remainder of their property more valuable.

## The New Woolen Mill.

Those persons who are interested in making San Francisco the great manufacturing center of California, as well as the great commercial emporium, should visit the mill just erected by the Golden Gate Woolen Manufacturing Company, on Bryant avenue, between Nineteenth and Twentieth Sts. They will there see realized, being worked out in a quiet way, an earnest of the great manufacturing possibilities of this peninsula. The company, of which Mr. McLennan is President, has erected a substantial brick two-story building, 408 ft. long, with a width in proportion, specially adapted for a woolen mill. And the company is offering a practical illustration of how to build up an industrious community here. It is affording employment at this time to 127 white men, young women and boys, with all the appliances to double that number when the mill is running to its full capacity. It may be well here to interject a remark to dispel any illusion as to the best location for a woolen mill in California. It is a great mistake to suppose that the best place for a woolen mill would be, say in the foothills on the east side of the San Joaquin valley, because there are the large runs of the principal wool growers. In the manufacture of woolen goods all kinds of wools are necessary.

Oregon and California wools are mixed for ordinary material.

The Stockton woolen mill purchases all the wool it uses for manufacturing, not at that point, but in San Francisco. Thus the raw wool utilized in Stockton has to bear the cost of transportation to this city, and then the manufactured goods bear the expense of carriage again to San Francisco, for a market. The same remarks apply in a measure to the woolen mills of Marysville, Sacramento, San Jose, Merced and Los Angeles. Most of the blankets, etc., there made are sent to the wholesale houses of this city to be distributed to the retailers. Thus it will be seen that the peninsula of San Francisco is the most eligible point on the Pacific coast for manufacturing, because what is true of a woolen mill applies with equal force to other industries. So that if our local government can be kept from taxing manufacturing property at higher rates than it has to pay elsewhere, the advantages of this point would be immensely greater than any other in the State.

## A Perfect Manufacturing Establishment.

The experience of Mr. McLennan has enabled him to plan and secure in his new mill the most perfect appliances and recent inventions in this branch of industry. The mill can turn out the finest cassimeres, or the most substantial blankets. Just now it is running on a government contract for kerseys. The mill stands on a block of land 408 ft. in length by 200 in width. There is upon the premises an artesian well yielding a supply of water large enough for two such mills. Let us hope the Supervisors will not succeed in fastening a water tax upon this well. The presence of this artesian well ought to go far to secure the success of the enterprise, as the Pioneer mills—a rival institution which has just commenced suit against Auditor Dunn to compel the auditing of the Spring Valley Water company's bills under the Bayly ordinance—claims to be paying \$600 per month for water. Such a well as the Golden Gate mills have does not involve the total expenditure, probably, of more than \$1,000, and water can be pumped by steam power to an elevation of 60 ft. at an expense of only half a cent per thousand gallons. The dyeing department is complete, the vats large, and this branch is under the direction of two experienced wool dyers, who have been brought here from Europe. There is everything in the factory to transform the fleece, as it leaves the sheep's back, into the finest cloth. It is not in the province of a newspaper article to describe minutely the process of woolen manufacture, but any one so disposed can profitably employ a couple of hours at the mills in watching the manifold processes of washing, carding, spinning, weaving, hurling, gigging, etc., before the cloth is finally pressed and delivered. The facilities for washing and dyeing are all that can be desired. The mixing picks is a Sergeant's patent capable of making 800 revolutions a minute. There are six sets of carding machines, Davis & Furber's patent, manufactured at Andover, Massachusetts. These carders can be run equal to nine sets or 2,128 spindles. From the cards the yarn is sent to the spinning machines. These also are of Davis & Furber's patent and are set low so as to be run by boys. The weaving is performed by women on broad Compton looms, of the newest patent. Of these the mill now has 30, with appliances for increasing the number. There are three sets of gigging machines, six sets of fulling mills, the whole machinery being driven by an elegant engine and hoilers of 120-horse power, manufactured by Prescott, Scott & Co., of this city.

## The Capacity of the Mill.

The mill has now capacity for turning out about \$400,000 worth of goods annually, but it could be easily increased to \$600,000. The market for the goods is practically unlimited. The mills now running on this coast do not supply one-fifth part of the woolen goods consumed. There is such a hard field in this class of merchandise in the variety of products, all manufactured from wool, that there is no danger of the mill not being profitably employed. It will take some time yet before the home consumption for cassimeres, kerseys, flannels, tweeds and blankets can be supplied. The great necessity for California to-day is the establishment of manufacturing enterprises. The agriculturist is as directly interested in this matter as the merchant or artisan. If there was a larger home consumption of wheat the farmers of the Sacramento and San Joaquin valleys would not be watching the harvests of other countries with such intense anxiety as they do at present. California has passed through the mining era and we have now arrived at the time when agriculture is possibly the leading industrial pursuit. The State is just entering upon the manufacturing epoch. And political economists who have been watching our progress here predict that the manufacturing will ultimately supplant the other two in aggregate wealth. It is certain that for the building up a prosperous commonwealth we must have the manufacturing element. Such institutions as woolen mills offer the most satisfactory solution of the hoodlum problem. At this time, also, industrial enterprises appear to promise the best interest on investment. There is nothing of speculation in them. They are legitimate outlets for surplus capital. When they are well managed there is a tolerable guarantee of immediate returns. San Francisco must ever be the main distributing point for the whole Pacific coast. In that regard it offers the most advantageous site for a manufacturing enterprise.

## Salt in California.

The discovery of salt springs in California may lead to important industries connected with the production and consumption of that very useful mineral. While the State Mineralogist was examining the limestone and marble deposits in Placer county, he was informed of two springs, the waters of which were salt, and although they had been known for many years, no special importance had been attached to them. The information was given too late to admit of one being examined, situated in section 30, township 13 north, and range 9 east, but a sample was obtained from the other—north-west quarter of section 15, township 13 north, and range 8 east, Mount Diablo meridian, an analysis of which, made in the laboratory of the State Mining Bureau, has proved very interesting.

The water is strongly calcareous. It is filled with mechanical impurity, and has a distinct saline taste. A drop evaporated on a glass slide, under the microscope shows an abundance of characteristic hopper-shaped crystals of salt. An analysis was made from the filtered water, and the amount of salt contained was found to be 1143.6 parts in 100,000. The full analysis is not given here for the reason that the water was taken from the spring without special care, and can hardly be supposed to be a fair sample. The localities mentioned will be carefully studied, and the results published in full.

It is highly probable that a well sunk at this locality would develop a valuable supply of brine—at all events it is worthy of the experiment. The strength of the water as shown by analysis, falls far short of that of deep salt wells sunk artificially. But this might be expected, as in its passage upward from an unknown depth, it would be likely to become diluted with fresh surface water. The profitable production of salt from this source is a question of labor, fuel and transportation. If a brine can be found, by sinking, that may be crystallized and delivered at a market with profit, the work will be continued, otherwise one of two things will follow: either greater economy will be studied and practiced, both in fuel and labor, or the work will be abandoned, to be resumed when conditions are more favorable. Salt is already manufactured in the State, generally from sea water, and it may be that at the present time this new source cannot compete with the old; yet in New York, which also has a sea coast, the salt wells of the interior counties have been worked with profit for many years, and will, no doubt, continue to be for many to come.

The following figures, from the geological surveys of that State, will show the importance of this industry: At the Onondaga salt works alone, the quantity of salt inspected in 16 years, from 1826 to 1841, inclusive, was 30,127,837 bushels. In 1862 the salt production of the State was 9,063,947 bushels, and the annual average since that date is estimated at 8,000,000 bushels. The State claims all the salines and leases them, collecting a royalty of one cent on each bushel of salt produced. A State Inspector is appointed, whose duty it is to report the product and to stamp on the packages the quality.

Extensive salt works are in operation in West Virginia, Kentucky, Michigan, Indiana, Missouri, Pennsylvania, and other States. In Michigan, attempts made to utilize the salt springs were at first unsuccessful; so important, however, was the matter considered, that the Legislature offered a premium of ten cents per bushel on all salt produced in the State. Michigan is now second only to New York in the production of salt.

There are three different methods of manufacture, as practiced in New York and other salt-producing States: First, boiling in kettles; second, solar evaporation; and third, evaporation in shallow pans by artificial heat. In the first method the kettles are of iron of a capacity of 100 gallons, set in brickwork in such a manner that one furnace supplies heat to a number. The kettles are filled with brine, which is kept in a state of violent ebullition. Lime salts first form, which are removed from time to time with suitable ladles, and the operation continued until the resulting salt is nearly dry, when it is removed, drained from the mother liquor, and fully dried. Solar evaporation is effected in shallow wooden vats, built in pairs, one on a higher level than the other. The brine is conducted from the wells to the upper set through wooden pipes, where it remains exposed to the heat of the sun until some of the foreign matters fall, when it is drawn off into the lower set in which the salt, now comparatively pure crystallizes out. By the third method the brines are evaporated in shallow iron pans, heated either by an open fire or by steam coils.

There are many ways of economizing in the manufacture of salt, the result of the experience of those engaged in its manufacture, in our own country and elsewhere, which would not immediately occur to those new in the business, such as pumping brines by windmills, and partly condensing by the action of a current of air, by which method the brines are pumped to a certain level and caused to fall in showers on faggots of small branches, by which the liquid is broken and divided in contact with the air, becoming rapidly and economically concentrated.

Salt wells are very stable in their nature. One in New York has been pumped for more than 40 years without the strength of the brines decreasing.



## Main Range Mines, Montana.

About midsummer last, great excitement was caused in Butte by the reported discovery on the summit of the main range of the Rocky mountains, several miles east of this city, of numerous and fabulously rich quartz leads which were said to be cropping out all over the country. As a natural consequence, many prospectors stampeded to the scene of excitement. The country, over a small area, was well prospected and quite a number of claims were staked out. Whether the majority of them are good, bad or indifferent, is yet to be ascertained, or, may never be ascertained, as very little development has so far been prosecuted. On three of the properties, however, considerable money has been expended and the results are very encouraging. Of these the Fourth of July is attracting the most attention. It was discovered on the Fourth of July by Budd and Lilja brothers. The prospect is located in a ravine leading into Park canyon, being very near the summit of the Main range and four miles from Butte. It is developed by a shaft 30 ft. deep, from which an east level has been extended on the vein to allow of the extraction of the very rich ore which is found near the surface. The quantity of ore produced from the Fourth of July is not large, but the quality has made up for the limited tonnage. Of first-class ore, averaging 340 ounces per ton and one ounce of gold, 24 tons have been produced, and of second-class ore, averaging 81 ounces and \$5.39 in gold, 30 tons have been produced. The Fourth of July ore is base in character and was worked at the Colorado smelter.

The Major Budd is located a short distance from the Fourth of July, and is owned by the same parties as the latter. It is developed by a shaft which is not yet deep enough to test the permanence of the vein. The ore in the bottom samples from 50 to 300 ounces silver, and quite a number of assays running up into the thousands have been made. A tunnel several hundred ft. long is being driven to tap the vein and, though the rock is somewhat hard, excellent progress is being made. About 12 tons of first-class ore and a large amount of an inferior grade are on the dump. It will all be shipped to the smelting works of the Colorado and Montana Co. for reduction.

The Fifth of July is another prospect owned by the same company, but aside from a little surface scratching which uncovered a promising looking ledge as far as explored, nothing has been discovered worthy of note. The gentlemen are to be congratulated on the possession of several very promising prospects, and one, the Fourth of July, would rank as a valuable property in any country. It is understood that a one-fourth interest was recently sold for \$10,000, from which fact some idea may be gained of its probable worth.

## Carson and Colorado Railroad.

The Virginia Enterprise says: Three ships—the *Western Belle*, the *Ennerdale* and the *Forfarshire*—have arrived at San Francisco with steel rails for the Carson and Colorado railroad. The rails will be brought up here as rapidly as possible. These rails are sufficient to lay the track to the point beyond Hawthorn where it will connect with the wagon road to Bodie. There are on hand ties sufficient to lay the track the full distance.

If the weather holds good track will be laid at the rate of a mile and a half per day. The track can and will be laid at this rate of speed.

The flat cars are all in from New York and the box cars are arriving. The passenger cars are now lying finished at Dayton, Ohio, at Varney & Smith's manufactory, and will be here in February. The Baltimore Locomotive Works will ship two more locomotives on the 1st of January.

The road is being pushed ahead as rapidly as possible, and it will be continued beyond Candelaria to the Gold Mountain mining region. Eventually it will be carried through to Colorado, at which point it will connect with some road running to or through that country. When completed the Carson and Colorado road will be not less than 500 miles in length. In its course it will tap and pass through the most promising mining and mineral regions in eastern Nevada. Not only will it pass through and near to mines of gold, silver, copper, lead, iron, antimony and the like, but will also tap a country in which are large fields of salt, soda, borax, alum, sulphur and many other very valuable mineral treasures, as chromate of iron, ochers and earths of various kinds and colors, not a few of which are likely to prove useful as fire-proof and other paints. Marble, gypsum, alabaster, jasper and other kinds of stone for various purposes are also found in the regions which the road will traverse.

**TRADE-MARK LAW.**—It is a rule in the law of trade-marks that the use of any name or symbol as a trade-mark must be new to make an exclusive right to use it as such. If the term has never before been used as applicable to a like article, it cannot be exclusively appropriated. It is also a rule of that law that if the article is known to commerce in general by the term claimed as a trade-mark, the claim is ill-founded. It is also a rule that if the term employed indicates the nature, kind or quality of the article, instead of showing the origin of it, an exclusive right to the use of the term may not be maintained.—*New York Court of Appeals.*

## Useful Information.

## The Glue Pot.

That indispensable and of all others the most important article to every well-regulated factory and cabinet shop, as well as many other kindred branches of trade. How common is it for the young artisan or apprentice to fall into the error of thinking that glue is king-cure-all, regardless of the application! In the first place, the article used should, by all means, be a good one, of which we presume every practical mechanic is a judge. It should then be dissolved in a proper manner and to the proper consistency or body, according to the work to which the application is to be made. Now comes the point at which there is the great majority of the failures; and the difficulty is not so much with the glue or application as it is in the preparation for the same. In other words, be sure that you are ready by having tried the work together, before you take the glue brush in hand. And if the work is mortise and tenon, you have made a failure that is not easily remedied if you have made the tenon too small either in thickness or width to fill perfectly the space in the mortise. To guard against this error, know what you are doing.

When you are cutting the mortise and tenon let it be either by hand or machinery; and when the glue brush is taken in hand, these general rules should always be observed, no matter what the character of the work. See that the temperature of the room is warm. If in cool weather, use artificial heat to bring the thermometer to 70° or 80°, if you can conveniently do so. But this depends entirely on the nature of the work. As to how much time must of necessity be consumed between the first spread or application and the final set, that time should always be brought down to the shortest period, if the nature of the work is such that it must of necessity take time to get the work together.

The great objection of chilled glue should be avoided by getting the wood to be glued first warmed and having your glue boiling hot. Dissolved glue contains a large percentage of water. The glue joint dries by the wood absorbing the water from the glue, and hence must of necessity expand the fibers of the wood coming in close contact with it, and if dressed off in this expanded condition, that part must dry out, although it takes time to do it, as the moisture cannot escape except through the pores of the wood. And upon the same receiving a high polish in the finishing room, you will see a sunken place 20 ft. off right over the tenons that were dressed off in the wet or uncontracted state. This same rule is applicable to joints in the edges of boards that are glued together. The tongue and groove joint becomes more expanded than the square joint, and hence takes longer to dry out, from the simple fact that it takes in more glue.—*Cabinetmaker.*

**GARLIC IN WHEAT—THE TROUBLE AND HOW TO REMEDY IT.**—The *United States Miller* says of this troublesome plant: It has a head somewhat like a seed onion and containing seeds about the size of a wheat grain and only a trifle lighter. This seed contains a glutinous material which, in grinding, gums up the pores of the burrs, necessitating frequent scrubbing of the stone faces. The best dress for grinding garlicky wheat is obtained by cracking them roughly all over the face and dressing them quite open about the eye. Separation of the garlic from the wheat is very difficult, by reason of the similarity in the size and weight of wheat and garlic grains. To manufacture garlicky wheat, it must be cleaned several times, then chopped or half ground. This will break the garlic, which is somewhat softer than the wheat, and allow its gum to diffuse itself through the meal, so as not to close the stones very much in the second grinding. It is better if the chopped grain be allowed to lie a considerable time before second grinding, that the garlic may dry.

**A NEW GAME.**—Mr. J. Banting Rogers has devised and published a game which is likely to be of service not only as a really interesting amusement, but also as a means of acquiring a considerable knowledge of navigation and meteorology. It is entitled the game of a "Voyage Round the World," and is played on a large board representing the ocean, suitably divided for counting by knots, and with bazards in the shape of cyclones, collisions, etc., which add excitement to the game. The game is played by means of a number of small models of ships of various kinds, and cards in which the number of knots is marked within which the players may move. Logs are kept, watches appointed and a captain of the watch to record distances, etc. Altogether it will be seen that in Mr. Rogers' ingeniously devised game there are great possibilities both of amusement and instruction.

**ASBESTOS POWDER.**—Asbestos powder, made into a thick paste with liquid silicate of soda, is used with great advantage for making joints, fitting tape and connecting pipes, filling pipes, etc. It hardens very quickly, stands any heat, and is steam-tight.

**LIME IN THE SEA.**—Every square mile of the sea contains from two and a half to three tons of limestone.

**THE MINNEAPOLIS FLOUR MILLS.**—Gen. C. C. Washburn, who recently visited Minneapolis, says that the mills of that place will grind 22,000,000 bushels of hard spring wheat during the year 1881. Minneapolis millers are now universally using roller mills. Eastern mills can no longer compete with Minnesota mills, for the reason that they cannot obtain the proper quality of wheat. All the hard wheat which reaches Chicago is mixed with soft to grade it up, and consequently millers there or east of there cannot get the same quality of wheat, all alike in its nature to make the best grades of what is known to the trade as patent flour. Minneapolis flour can be delivered in Great Britain for \$1.20 per barrel above its cost in Minneapolis. Minneapolis millers are taking steps to improve their transportation facilities, so as to transport their produce in as direct and short a line as possible, and as soon as the arrangements are perfected, but little flour will go East by way of Chicago.

**INFLUENCE OF ELECTRICITY ON VEGETATION.**—In hamboos the flow of sap takes place at the beginning of the rainy season, but vigorous shoots rarely grow before the thunder storms, which generally precede the harvest. The rapidity of their growth increases with the violence of the storms, amounting sometimes to as much as 70 ft. in 30 days, the vegetation being most active during the night. Capt. Sieman suggests that the cause of this sudden growth may be the increase in the quantity of nitrogenous compounds, which are greedily absorbed by the humus that surround the roots of the hamboo. The facts offer a curious confirmation of the experiments of Dr. Sieman upon the influence of electricity on vegetation.—*Les Mondes.*

**SHOE-HEELS OF COCONUT FIBER.**—The outside fiber of the coconut is now used in England in forming shoe-heels. The product is said to be one of the best substitutes for leather thus far devised for the purpose. The disintegrated fiber is stamped into form under a heavy pressure, apparently after being mixed with some cementing liquor.

**TO INFLATE SMALL BALLOONS.**—Gas for inflating small balloons may be made by placing a quantity of zinc scraps in a bottle, pour over them a mixture of sulphuric acid and water, and hydrogen gas will be rapidly evolved. Convey this gas through a wash-bottle to your balloon. This experiment should not be performed in the vicinity of a light or fire.

## Good Health.

## Temporary Deafness.

According to Dr. H. Augustus Wilson, a very common cause of deafness is the hardening of wax in the ear and the unscientific plan that people adopt for its removal. They generally succeed in making a bad matter worse. The ear is not so exquisitely sensitive to the presence of foreign matter as the eye, and hence those who work at the ear with hairpins and toothpicks are likely to injure themselves irreparably. Only the softest materials and the gentlest pressure should be used in cleaning the ear. In a recent clinical lecture, Dr. Wilson gave, in popular form, some very useful and practical information touching the removal of ear wax. If the ticking of a watch can be heard at a distance of 25 inches the hearing is good. Each ear should be tested by the watch separately. Noise in the head, sometimes ringing, frequently are due to hardened wax in the ear. Sudden deafness is sometimes caused as follows: A small mass of wax, from ill-health or uncleanness, becomes hard. A continued secretion of wax then blocks up the ear tube still more. An injudicious attempt is then made to remove the wax by introducing, perhaps, a match end, a pin bead, or a pen holder, which instead of removing pushes down the wax and packs it against the tympanum; or by a sudden draught or the act of swallowing the wax is suddenly pressed upon the membrane, and loss of hearing immediately ensues, because the membrane can no longer vibrate. The removal of the wax is in some cases, especially those of long standing, somewhat difficult; but with gentle treatment and patience may finally be accomplished and the hearing fully restored. The best ordinary means for removing wax, when not badly compacted, are half a drachm of sodium carbonate dissolved in an ounce of water, applied lightly, by means of a bit of absorbent cotton or sponge attached to a suitable handle. When the wax is much compacted it may be softened by means of water, quite warm, and a syringe.—*Sci. Am.*

**EFFECTS OF ELECTRIC LIGHT.**—It is said that if a person of fair complexion exposes himself to the electric light for some time in examining the action of lamps, the hands and cheeks will show all the symptoms of "sunburn," even in midwinter, and he will develop freckles on his countenance as quickly as when he goes about unprotected by a sun umbrella in midsummer.

**SEA SICKNESS.**—Mr. F. W. Cory, in the *Lancet*, states that the best remedy he has found for sea sickness is a combination of small doses of bromide of potassium and hydrate of chloral taken with citrate of magnesia during effervescence.

## A Poisonous Fly Bite.

John Story, a warehouse laborer in New York, recently died of malignant pustule caused by the bite of an insect which looked like a fly.

Story was at work in a tobacco warehouse, and, while handling a bale of Havana tobacco, he felt a sharp pain in the left side of his neck. Instantly he clapped his hand on the spot, and a winged insect, which he took to be a gnat, flew away.

The pain was but temporary, and he paid no attention to it until the following day, when an inflamed pimple had formed on the spot where he had been bitten. This pimple annoyed him considerably, and he tore it open.

The next day the spot was very much inflamed, the inflammation extended in a circle as large as a silver quarter about the wound. The circle quickly enlarged, the inflammation increased, and Story became frightened and called in a physician, who recognized the wound as a malignant pustule, which would undoubtedly prove fatal.

The skin about the wound burst, and the inflammation extended along the neck toward the head, and the lower portion of Story's face was swelled to twice its natural size. Symptoms of blood-poisoning showed themselves, and the patient lingered in great agony for two or three days, when death ended his sufferings.

**A CUP OF TEA.**—In a recent lecture by Mr. G. R. Tweedle, F. C. S., London, on "A Cup of Tea," the speaker divided the subject into four sections—the tea, the water, the milk and the sugar. The lecturer first drew attention to tea drinking with every-day life, and showed that the principal components of tea were theine and the essential oil of tannin, which latter possessed astringent properties. He informed the audience that the best time to take tea was about three hours after dinner or any other heavy meal, and deprecated in the strongest terms the excess to which tea drinking is carried by some people, asserting that such a practice induced a nervous disorganization and impeded digestion. He showed that the sole difference between black and green tea was one of preparation, and that both kinds could be obtained from the leaves of the same plant. After asserting that the adulteration of tea had very much decreased of late years, which the tea-drinking public will be glad to know, the lecturer proceeded to treat of the various kinds of shrubs grown in different parts of the world and the countries where the different kinds of teas were consumed, the lecturer came to the consideration of the milk, its value as a nutritive agent, and referring to its adulteration he made the astounding assertion that in London alone every year no less than £70,000 was spent on water which was used for milk. Passing on to regard the sugar, the lecturer denied the common error that sugar was injurious to the teeth, bringing forward as an example the negroes of Jamaica, who, he said, though they were the greatest eaters of sugar in the world, were proverbial for their beautiful teeth.

**AN IMPROVED GLUE DRESSING FOR WOUNDS.** Cabinet makers and wood workers generally are familiar with the uses of glue in dressing tool cuts and other slight wounds incident to their calling. The glue pot is always handy in their shops, and a glued rag answers as well as the best adhesive plaster. In a recent paper before the Philadelphia Academy of Surgery, Dr. Hewson recommends the addition of acetic acid to the glue, and a little attar of roses to cover the odor of the glue and the acid. This compound spread on paper or muslin makes, he says, a good substitute for adhesive plaster for surgical use. It is easily and quickly prepared, simply by putting into a vessel of boiling water, a bottle containing one part of glue to four, by measure, of the acid, and letting the bottle remain in this bath until the glue is fully dissolved and mixed with the acid. Common glue may be used and official acetic acid, to be had at any drug store. The mixture should be kept in a wide-mouthed bottle, well stoppered by a long cork, which can always be removed by heating the neck of the bottle. Care should be taken to keep the mouth of the bottle clean by wiping it well with a cloth dipped in hot water. A bottle of this cheap and easily prepared dressing would be a good thing to have at home as well as at a workshop.

**A SPINAL ROOT OF THE OPTIC NERVE.**—Stilling, of Strasburg, showed preparations to the International Ophthalmological Congress at Mailand, in September last, which he believes demonstrate the existence of a spinal root of the optic nerve, which brings the retina into direct connection with the medulla. This root passes from the external corpus geniculatum, in a winding course, deep between the bundles of the crus cerebri, and can be traced into the pons; and it appears to course down in the direction of the medulla, although its further progress cannot be demonstrated. The existence of this branch is interesting on account of the light it throws on certain physiological relations between the medulla and the retina, and may constitute the hitherto undiscovered link between certain diseases of the spinal cord and of the optic nerve.

**COFFEE FUMES.**—In some recent experiments at Paris the fumes of burning coffee were shown to have a disinfecting power quite remarkable.





W. B. EWER..... SENIOR EDITOR.

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SAN FRANCISCO:

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#### The Week.

The principal event of the week in mining circles has been the most unfortunate fire on the Comstock, by which the Hale & Norcross hoisting works were burned. This disaster is referred to in another column. If the big engine is damaged beyond repair, the whole loss by the fire will be over half a million of dollars. The Comstock has been particularly unfortunate of late.

The Legislature, in session at Sacramento, has got down to work, but so far has enacted nothing of special interest to the mining or manufacturing industries.

Reports from the mines this week are pretty full and are very encouraging.

The election of our United States Senator is also an event to be chronicled. Gen. John F. Miller, the new Senator, is a man of large experience, liberal ideas and good practical judgment. He has a full knowledge of the needs of California, and being a man of fine education and oratorical talent, will not lack the means of setting them forth.

A SOARED MULE.—Employees of the Streator (Ill.) Coal Co. attempted to lower a fresh mule into the mines. When the cage started down the animal was overcome with terror, and when they went to take him from the cage they found he had died of fright while descending.

IDAHO, as a mining section, is beginning to attract the attention of capitalists and prospectors at a distance, and next season will see a greater influx of people in the Territory than at any time since the early days of our placer excitement.

THE new Oxford University hoathouse, with many valuable boats, is burned.

#### Metallurgical Centers.

For a number of months past, there have been rumors of projects looking to the utilization of the low-grade ores of the Comstock, as well as those of numerous other metalliferous veins within a radius of 50 miles. One of the latest of these rumors is to the effect that a prominent mining man in Virginia City is causing the dismissal of hundreds of working miners, with the view of breaking up the organization of the Miners' Union in that city, as a preliminary step toward such a reduction of miners' wages as is looked upon as necessary to the profitable extraction of the millions of tons of low-grade ore said to exist in the upper levels of the various mines on the Comstock. This reduction, heretofore proposed as applicable only to the men employed in those upper levels, has been resisted by the Union, from the fear that it may be only the entering wedge of a universal diminution of the wages of labor in that section. Whatever truth there may be in this and other reports, it appears highly probable that unless some reduction of expenses is in some way made, the further working of the Comstock mines must soon be relegated to another generation. If this is true, the question is simply whether it is better that the large number of men now employed on and about the Comstock lode, shall be compelled to seek a livelihood elsewhere, or shall continue to be employed where they now are at a lower rate of compensation. Whatever power the Miners' Union may have to prevent the employment of men at low wages, it certainly has none to enforce their being employed at a loss to those who pay.

If the present deep workings, in which the men who toil and risk their lives, undoubtedly deserve all the pay they get, do not hold forth a hope of profit to all concerned, it would certainly seem to be the part both of wisdom and humanity to stop them. On the latter score it is doubtful if they should not be stopped whether profitable or not. But so long as men can be found who are willing to sacrifice their health, in order to earn a trifle more money than they could get in a rational occupation; in other words, as long as there are fools to be found, to work voluntarily in such a place, as though the digging out of a little more gold and silver was the sole object of human effort, and the loftiest aim of human ambition, it is not to be expected that those who profit by the folly, without having to endure any of the hardships, will look beyond their own immediate interests. This is a matter, however, which must be settled between the parties immediately concerned.

It has long been the opinion of the writer that the natural development of our mining interests would lead to the establishment of a system of metallurgical centers, at points favorably situated for obtaining power and material, and furnished with all the appliances known in metallurgy, for the reduction of all classes of ores on a large scale.

An indispensable corollary to such a system would be the construction of narrow-gauge railroads, by means of which the ores from a considerable region surrounding each center, could be gathered in at a low cost for freight.

The advantages of such a system must be apparent to every thinking person. Not only would many costly experiments and silly projects be prevented, while many owners of mines who can now do nothing, would be enabled to work their properties, to the advantage of the community at large, but the sphere of usefulness of men of ability and experience in metallurgy, who are now wasting their time in superintending comparatively petty operations, would be greatly enlarged, and an increased number of mine owners would reap the benefit of a thoroughly scientific and comprehensive treatment of their ores, for the extraction of not only gold and silver, but also of lead, copper, antimony and all other metals that could be made profitable through the agency of large capital, and the best metallurgical skill.

The advantages of mixing different kinds of ores, for the different roasting and smelting processes, are well known to metallurgists, but it is impossible for operators in small and isolated works to avail themselves of these advantages.

Another great benefit which would result from the establishment of such works as are here contemplated, would be that the variety and magnitude of the operations carried on would necessitate the employment of a number of assistant superintendents and overseers, who, being under competent supervision, would have the best opportunity to perfect their knowledge of practical metallurgy, while young men having merely a theoretical knowledge of the art, could be received as students or workmen, and would acquire a thorough knowledge of the whole business, instead of a narrow and one-sided familiarity with one or two processes, as is now too often the case.

From events which have recently occurred in Carson City, Nevada, there seems to be some probability that a movement in this direction may soon be inaugurated at that point. Should it prove so, a solution may be found of the problem of the profitable working of the low-grade ores of the Comstock.

In the consideration of metallurgical processes adapted to the conditions of this country, the various methods of leaching ores are deserving of attention. One of the principal ob-

stacles to the introduction of these methods appears to be the very general occurrence of a certain proportion of gold in conjunction with silver in our ores, and the circumstance that no single leaching process of much practical utility, adapted to the extraction of both of the metals, is yet known. Another difficulty is that many ores are not well adapted to leaching, in the condition in which it is necessary to treat them, in the small and imperfect works to be found at the mines.

That the importance of the first obstacle has been exaggerated, and that the second may be overcome by the resources of science, when backed by a sufficient amount of capital, it will be the endeavor of the writer to show in a future article.

#### Fire on the Comstock.

The Comstock seems to be out of luck. First it is one thing, then another. First water, then fire. They lately had a big flood in the Alta, now they have a big fire at the Hale & Norcross.

At 7:30 on Wednesday evening, by the explosion of a lamp in the men's changing room, the Hale & Norcross hoisting works were set on fire. At first the men on top tried to put the flames out, but were unsuccessful, and then Superintendent Deidesheimer sent a man down on the cage to notify those at work in the mine of the fire, with directions to make their way out through the Chollar-Norcross-Savage shaft through the connection on the 2400-ft. level. After a general alarm of fire was sounded, every effort was made by the Department and men on the surface to subdue the flames, but the wind blew a gale, and all efforts were unavailing.

As soon as the flames were under control, the water was turned down the shaft to put out any brands which had fallen down, and to prevent its burning. Since connection with the Chollar on the 2400-ft. level, the shaft has had an up-cast which prevented the smoke from being carried down into the mine. The shaft is not thought now to be much damaged. There were at the time of the fire a shaft of eight men working in the ore body on the 2100 level, and the same number on the 2400 level running the north lateral drift. Considerable anxiety was manifested about the safety of the upper shift, but at nine o'clock all, together with the north station tenders and pump man, made a safe exit and were raised through the Chollar-Norcross-Savage shaft.

The works destroyed consisted of the main building, containing two hoisting engines, pump engine, air compressor, etc. On the north were the boiler room, containing four sets, the superintendent's changing-room and machine shop. East were the blacksmith shop, ore-dump and rope house. Southeast was the carpenter shop, portions of which, with the gallo frame and other strong timbers are standing. The timbers and lumber in the yard south were saved. It is doubtful if the works are rebuilt further than to raise and lower the men, as work can be done through the Chollar-Norcross-Savage shaft, of which the Hale & Norcross is part owner.

#### Water Rights.

The Supreme Court has held in the case of the Park Canal and Mining Company vs. Hoyt that although an appropriator may be entitled to the flow of the stream of water undiminished, the water above his ditch is not his personal property. The evidence in the case tended to prove that the Park company owned a ditch dug for the purpose of conducting water from the Cosumnes river to Squaw Hollow creek, and also of another ditch leading from Squaw Hollow creek at a point below the Cosumnes ditch. Hoyt diverted water from Squaw Hollow creek at a place between the two ditches. It was in evidence that at all times when the water was taken by Hoyt there was not sufficient water in Squaw Hollow creek ditch. But there was no evidence as to the quantity of water then running from the Cosumnes ditch into Squaw Hollow ditch, or that any was flowing through the ditch. For aught that appeared in the testimony all the water diverted by Hoyt was water naturally flowing into Squaw Hollow creek. If this was the case, says the court, it is clear that an action for the value of the water, as personal property, cannot be maintained. The natural bed of Squaw Hollow creek required an artificial conduit to the extent, and only to the extent, that the waters of Cosumnes river flowed through it. The water brought to Squaw Hollow creek by the Cosumnes river ditch alone, if any water can be so considered, can be considered the personal property of the Park company.

ACADEMY OF SCIENCES.—At the meeting of the Academy, on Monday evening next, A. W. Jackson of the University of California, will read a paper on "The Occurrence of the Precious Metals in Sandstones and Other Sedimentary Rocks." Prof. Davidson will present a letter from Dr. Schroder, who made the lenses for the large Berlin refractor, stating that he is now prepared to make refractors, up to 50 inches clear diameter, upon a new principle which enables him to obtain much larger dimensions with less thickness of glass than is possible with the double lens objectives.

#### Physical Studies of Lake Tahoe.—No. 3.

[Written for this Press by PROF. JOHN L. CONTRA.]

##### Color of the Water of Lake Tahoe.

One of the most striking features of this charming mountain lake is the beautiful hues presented by its pellucid waters. On a calm, clear, sunny day, wherever the depth is not less than from 50 to 60 meters, to an observer floating above its surface, the water assumes various shades of blue; from a brilliant cyan blue (greenish blue) to the most magnificent ultramarine blue, or deep indigo blue. The shades of blue, increasing in darkness in the order of the colors of the solar spectrum, are as follows: Cyan blue (greenish blue), Prussian blue, cobalt blue, genuine ultramarine blue and artificial ultramarine blue (violet blue).

While traversing one portion of the lake in a steamer, a lady endowed with a remarkable natural appreciation and discrimination of shades of color declared that the exact tint of the water at this point was "Marie Louise blue." The waters of this lake exhibit the most brilliant blueness in the deep portions, which are remote from the fouling influences of the sediment-bearing affluents and the washings of the shores. On a bright and calm day, when viewed in the distance, it had the ultramarine blue; but when looked fair down upon it was of almost inky blackness—a solid dark blue, qualified by a trace of purple or violet.

Under these favorable conditions, the appearance presented was not unlike that of the liquid in a natural dyeing vat. A clouded state of the sky, as was to be expected, produced the well-known effects due to the diminished intensity of light, the shades of blue became darker, and in extreme cases, almost black blue. According to our observations, the obscurations of the sky by the interposition of clouds, produced no other modifications of tints than those due to a diminution of luminosity.

In places where the depth is comparatively small and the bottom is visibly white, the waters assume various shades of green; from a delicate apple green to the most exquisite emerald green. Near the southern and western shores of the lake, the white sandy bottom brings out the green tints very strikingly. In the charming cove called "Emerald bay," it is remarkably conspicuous and exquisitely beautiful. In places where the stratum of water covering white portions of the bottom is only a few meters in thickness the green hue is not perceptible, unless viewed from such a distance that the rays of light emitted obliquely from the white surface have traversed a considerable thickness of the liquid before reaching the eye of the observer. The experiments with the submerged white dinner plate in testing the transparency of the water, incidentally manifested, to some extent, the influence of depth on the color of the water. The white disk presented a bluish green tint at the depth of from 9 to 12 meters; at about 15 meters it assumed a greenish blue hue, and the blue element increased in distinctness with the augmenting depth, until the disk became invisible or undistinguishable in surrounding mass of blue waters. The water intervening between the white disk and the observer did not present the brilliant and vivid green tint which characterized that which is seen in the shallow portions of the lake, where the bottom is white. But this is not surprising when we consider the small amount of diffused light which can reach the eye from so limited a surface of diffusion.

In studying the chromatic tints of these waters, a hollow pasteboard cylinder, 5 or 6 centimeters in diameter and 60 or 70 centimeters in length, was sometimes employed for the purpose of excluding the surface reflection and the disturbances due to the small ripples on the water. When quietly floating in a small row-boat, one end of this exploring tube was plunged under the water, and the eye of the observer at the other extremity received the rays of light emanating from the deeper portions of the liquid. The light thus reaching the eye presented essentially the same variety of tints in the various portions of the lake as those which have been previously indicated. Hence it appears, that under various conditions, such as depth, purity, state of sky and color of bottom, the waters of this lake manifest nearly all the chromatic tints presented in the solar spectrum between greenish yellow and the darkest ultramarine blue, bordering upon black blue. It is well known that the waters of oceans and seas exhibit similar gradations of chromatic hues in certain regions. Navigators have been struck with the variety and richness of the tints presented in certain portions by the waters of the Mediterranean sea, the Atlantic and Pacific oceans, and especially those of the Caribbean sea. In some regions of the oceans and seas, the green hues, and particularly those tinged with yellow, are observed in comparatively deep water, or at least where the depths are sufficiently great to prevent the bottom from being visible. But this phenomenon seems to require the presence of a considerable amount of suspended matter in the water. In no portion of Lake Tahoe did I observe any of the green tints, except where the light-colored bottom was visible



This was probably owing to the circumstance, that no considerable quantity of suspended material existed in any of the waters observed.

#### Physical Cause of the Color of the Waters of Certain Lakes and Seas.

The study of this beautiful colors presented by the waters of certain lakes and seas has exercised the sagacity of a great number of navigators and scientists, without resulting in a perfectly satisfactory solution of the problem. And, although recent investigations seem to furnish a key to the true explanations, yet the real cause of this phenomena appears to be very imperfectly understood, even among physicists.

For example, some persons persist in assigning an important function to the blue of the sky in the production of the blue color of the water. Thus, as late as 1870, Dr. Aug. A. Hayes, in an article on "The Cause of the Color of the Waters of Lake Geneva," (Am. J. Sci., 2d series, Vol. 49, p. 186, et seq.—1870)—having satisfied himself by chemical analysis, that no coloring matter existed in solution, distinctly ascribes the blue color of the water to the reflection and refraction of an azure sky in a colorless water. He insists that the water of this lake "responded in unequal coloration to the state of the sky as if the water mirrored the sky under this condition of beauty."

The question here presented is highly important in discussing the cause of the blue color of the deep waters. For the first preliminary point to be established, is whether the colored light comes from the interior of the mass of water, or whether it is nothing more than the azure tint of the sky, reflected from the surface of the liquid? In other terms, whether the water is really a colored body, or only mirrors the color of the sky. If the water merely performs the functions of a mirror, the explanation of the blue color of such waters is so simple and obvious that it is astonishing how it comes to pass that physicists have been so long perplexed in relation to the solution of this problem. This idea is susceptible of being subjected to decisive tests. It seems to me that the phenomena cannot be due to mirror-like reflections of the azure sky for the following reasons: (a) If the blue color of the water is produced by the reflection of an azure sky all tranquil waters should present this tint under an equally vivid blue sky. It is well known that this deduction is not confirmed by observation. (b) In looking vertically down into the blue waters—a condition rendering surface reflection very small—it is obvious that the tints emanate from the interior of the liquid. (c) When the sky is clear and the surface of the water is tranquil, the azure tint frequently far surpasses in vividness that of the sky itself. This would of course be impossible if the color was nothing more than the reflected image of the azure sky; since the reflected image must be less brilliant than the object. (d) A clouded state of the sky does not, under ordinary circumstances, prevent the recognition of the blue tint of the waters; although of course it is of less intensity. This fact is attested by a number of observers in relation to the blue waters of both lakes and seas; and it is evidently inconsistent with the idea of a mirror-like reflection of an azure sky. (e) Tranquil waters sometimes reflect the warm colors of the horizon, representing all the tints of a luminous sky so exactly that sky and water appear to be blended with each other. Under these conditions the blue tints from the interior of the liquid are overpowered by the more brilliant surface reflections; for, if a gentle breeze ruffles the surface with capillary waves, the bright surface tints vanish, and the blue from the interior immediately predominates. (f) My experiments with the "pasteboard exploring tube," seem to prove beyond question that the color-rays proceed from the depths of the water and not from its surface; for in this case superficial reflection was eliminated. (g) Finally, the character of the polarization impressed upon the blue light emanating from the azure waters of the lake of Geneva, (first announced by J. L. Soret, in the spring of 1869, and subsequently confirmed by other observers), affords a satisfactory demonstration that the blue rays are not reflected from the surface, but, on the contrary, are veritable luminous emanations from the interior of the liquid.

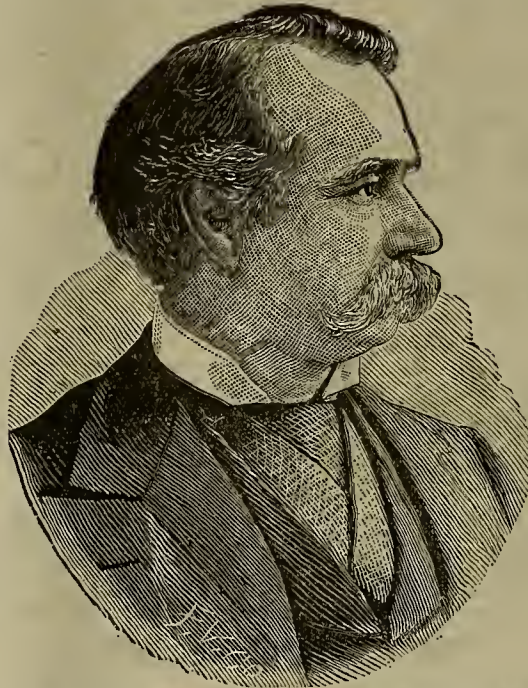
This point will hereafter receive special consideration in connection with the cause of the blue color. The foregoing reasons appear to be abundantly sufficient to establish the fact that in the blue waters of lakes and seas the color-rays do actually come from the interior of the mass of liquid. Moreover, the experiments of Soret and Tyndall prove that when a beam of light, thrown into an obscured chamber, is concentrated by a lens and made to pass through small masses of the blue waters taken from a number of Swiss lakes, as well as from the Mediterranean sea, the luminous cone which traversed the liquid was in all cases distinctly blue. These experimental results are absolutely demonstrative of the fact that the diffused blue light proceeds from the interior of the transparent liquid. (Soret, in "Archives des Sci., Phys. et Nat.," tome 39, p. 357—December, 1870. Tyndall, in "Nature," Vol. 2, p. 489.—Oct. 20, 1870.)

\*Indeed, in many cases this surface reflection seriously interferes with the vivid perception of the blue tints from the interior. The beautiful blue light which illuminates the interior of the famous "azure grotto" on the shores of the island of Capri, in the Bay of Naples, is of great splendor, because its waters, while receiving a full supply of the transmitted solar beams through the large sub-aqueous entrance, are protected from the surface reflection by the smallness of the opening above the water level.

#### Our New Senator.

We borrow from the *Resources of California* an excellent likeness of the new U. S. Senator from California, Gen. John F. Miller. Gen. Miller came to this State in 1853, and having received a thorough education in the profession of the law in New York and at his old home in South Bend, Indiana, where for a time he practiced, he opened a law office at Napa, and commenced to practice at that place and in this city, reaping an honorable reputation, both with the members of the bar and the community generally.

Called back to Indiana in 1856 by illness in his family, he was compelled to stay there for a time, much to his own regret, always having intended to make this State his permanent home. When Gov. Morton called the Legislature of Indiana together, at the time of the firing upon Fort Sumter, for the purpose of providing means for any requisition of men, etc., that the general government might make, Miller, who had served in the State Senate, was appointed by Gov. Morton as an aid on his staff with the rank of Colonel. Resigning his seat in the senate, he immediately organized the 29th Regiment of Indiana Volunteers, and was appointed its Colonel, and early in October, 1861, joined Gen. Rousseau's forces, then in Kentucky. In the following February he succeeded to the command of a brigade, under Gen. Buell, who was then in and around Bowling Green, and took a leading part in all the subsequent campaigns in that State. His war record is without a blemish. In all the military trusts that were given him, he showed the qualities of the soldier, and suffice it to say, that not a scintilla or breath of suspicion upon any act of his while in the army was ever brought



GEN. JOHN F. MILLER, U. S. SENATOR FROM CALIFORNIA.

against him, and the loss of one of his eyes attests to his bravery and suffering while serving his country in the field.

In September, 1865, he resigned his position in the army to return to California with his family, intending again to enter into the practice of his profession. Recognizing his worth, however, soon after his arrival he was appointed, by President Johnson, Collector of this port, which position he held until 1870, declining a re-appointment. Leaving public life, Gen. Miller engaged in commercial pursuits, which gave the fullest exercise to his executive ability. He is now to go to Washington as successor to Senator Booth.

The work of clearing out the debris of the cave that occurred on the 10th of last August, at the Spenceville copper mine, was completed December 14th, on which day the extraction of ore was resumed. Ore can be taken out and put in the sheds a great deal cheaper and more rapidly than before.

The Central City Register says that the Rothschilds purchase silver at the Boston and Colorado Smelting Works at Argo, Colorado, for shipment to China. The silver turned out at these works, to the value of nearly two millions per annum, may be called absolutely pure.

The output of the Leadville mines for the week ending December 31st, showed an increase in the aggregate and several new names in the producing list. The total output figures 799 tons. Iron Silver stands at the head with 100 tons a day; Morning Star, 80; Evening Star, 60; Chrysolite, 53; Highland Chief, 40; Silver Cord, 35; Silver Wave, 30; Oro La Plata, 30; Matchless, 25; Lee, 65.

It is reported that Geo. D. Roberts has secured a controlling interest in the Robinson Con. mine, Colorado.

#### Legislative.

This State Legislature has, so far, been doing more in the way of introducing bills than in considering any of the measures brought before it. Among those measures which may be of interest to our readers of the industrial classes are the following:

Jackson has introduced a bill providing that work on public buildings shall be done by day's work.

By May—Amending the Mining Bureau act, so as to allow the counties contributing to its fund to deduct from their collections the necessary expenses incurred.

By Brown—To add 18 sections to the Civil Code relating to mining laws.

This Nelson act, prohibiting the buying or selling of stock on margin, was referred to the Committee on Corporations.

By Enos—To allow the recovery of money paid on contract for shares of stock sold on margin.

By Enos—An act prohibiting banks and loan societies from charging fee to borrowers for examination of the title of security offered. [The same bill was introduced last year, and received the favorable report of the Judiciary.]

Cameron presented a document from the Regents of the State University, asking for an appropriation of \$45,000, and setting forth the wants of this institution. Referred to the Committee on Ways and Means.

By Lane—Also to protect the agricultural interests of California by prohibiting hydraulic mining.

By Wasson, of Mono—An act providing for

\$1.50 a day, and had riveted 900 surface yards a half mile this side of the English break. The contractor, Pat Nye, did this work for the Commissioners; did work of the same character further up the river; the contract price was 40 cents a surface yard. The witness hauled the brush farther than Nye did, while the latter received 27 cents for dirt which could be furnished at 14 cents. Bryte was then cross-examined by Parkes, and said the contract was let in sections, the whole amounting to \$10,000; he thought the price too high; the contract was let October 26th, at which time Nye ran some risk, and it was the opinion of the witness he ought to be allowed something for that; the witness was not prepared to say the contract was let too high, but he blamed the Commissioners for leaving the work in such a condition that it would have been destroyed if he (Bryte) had not done the work which he did.

State Engineer Hill testified that the dam had been under the charge of H. W. Wilson, resident engineer; he gave evidences about the general character of the work done, but said he had not inspected it since the operations ceased. In his opinion the aggregate contract was not let too high.

Niles Searles, one of the Drainage Commissioners, was the last witness examined. He recollected only one bid for the work received. The difficulty in obtaining brush caused delay, but Bryte, Carey and others said they would unite and get the material. The Commissioners then took up the bid of Nye. On some things he had bid high, on others too low. Considering the lateness of the season, October 26th, and the danger of loss in the case of flood, they had let the contract to Nye at his own figures, the work to be completed in 60 days. If the work had been done in June, it would have been from 10% to 16% cheaper. Thirty-eight cents and not 40 cents per cubic yard was the price paid for river work. The Commissioners had always let contracts to the lowest bidders.

A concurrent resolution, by Sears, on the debris expenditures and other matters, was referred to the Committee on Federal Relations. It reads as follows:

WHEREAS, The State of California has expended over \$500,000 in engineering, levees and dams, and has practically demonstrated that the river channels of this State, which are now filled with mining debris to the extent that navigation is almost destroyed, can be rectified and deepened by carrying out the recommendations of the eminent engineers, Eads, Mendell and Hall; and

WHEREAS, The rivers and bays of the State are the transportation competitor of the railroads, and should be preserved for commercial purposes of this State and coast; and

WHEREAS, The time and exigency have arrived when the general Government should take charge of this work and make the necessary appropriations to carry out the plan of improvement recommended by said engineers; therefore,

Resolved, by the Senate, the Assembly concurring, that our Senators be requested, and our representatives in Congress be instructed, to ask and urge the general Government to make the necessary appropriations without delay to carry out this important improvement.

#### A New Coal Supply.

Some time since we gave pretty full details concerning the Carbon Hill coal mine, in Washington Territory. The mine is now being worked, and the following telegram of the 5th, from New Tacoma, on Puget sound, shows that the first shipment has been made: "The steamer *Empire* sailed for San Francisco early this morning, with 880 tons of Carbon Hill coal. The bark *Fremont* is due this evening for a cargo of 600 tons."

The deposits are about 30 miles from Tacoma, but there is a railway from there to the water, and it is thought that coal can be mined and shipped to San Francisco cheaper than from any other point. The work of prospecting and getting the deposits ready has been in progress for some time, and considerable money has been expended. It is claimed that the deposits are the best and most extensive yet found on the Pacific coast. Experts say that there is nearly 30,000,000 tons of coal above high water mark or drainage line. Already 18 veins have been developed, varying from 3 ft. to 14 ft., and showing an aggregate of 118 ft. The quality of the coal resembles the famous Cumberland coal of Maryland, which is one of the highest priced coals received in this market. It is especially adapted to forges. One of the veins has been named the Pacific Cumberland. Tests from the vein, in the presence of experts, have given great satisfaction. Another vein shows very superior gas coal. It is said to be the only coke coal discovered on the coast. Thus far there has been no excitement over the discoveries, but really if the quality and extent of this coal bed be as stated, it is an event of great importance to the Pacific coast. The proximity of the deposits to the terminus of the Northern Pacific railroad and to water carriage to San Francisco render them of great value to the owners.

COL. FAIR declines to take any stock in the Carson smelting works. He says he already has too many idle reduction works.



## Deep Mining in Bodie.

From the extensive and costly preparations being made by three or four mining companies operating in this district, it is evident that we are soon to have deep mining in Bodie; and from the plain statement of facts about the underground operations and indications in the Standard mine, given by our reporter on Thursday morning, and a similarly graphic picture of the interior of the Bodie mine, appearing in this issue, it is quite as evident that the capitalists who are putting hundreds of thousands of dollars into powerful pumping and hoisting machinery are fully assured of large returns on their investments. These two leading mines of the north end are being quietly but steadily and systematically opened for more extensive and rapid exploitation, and while this is being done no effort at display or at "hulling" the stock is being made.

A good deal has been said about the "rich reserves" in the Standard, but any intelligent observer who will visit the various levels in the mine will discover that there is something like 10 years' "reserves" in sight, and all rich. But little work has yet been performed on the 700-ft. level, and yet that little reveals the fact that the two great ore veins of that mine (the Burgess having merged into the westerly vein of the two above the 700), are fully as large if not larger on that as on the upper levels, and equally as rich. These veins, where cut by the shaft, reveal a tendency to a change of dip from the west to the east, which would seem to indicate that the great ore channel below had been hurled up against the solid mountain on the west and the crest of the wave divided and curled over toward the east. On the 1,000-ft. level a cross-cut is being run to the east for the Bruce and old Standard veins, and the probabilities are that they will be cut at an early day. Don't think as soon as the new machinery is in place a cross-cut will be run west to cut the two immense veins that now lie west of the shaft on the 1,000-ft. level, and when these are developed the company will require probably not less than 100 additional stamps.

The prospects in the Bodie mine are equally encouraging. Within a few months the Lent shaft will be down below the water level and will be equipped with powerful pumping machinery. Then the Fortuna ledge, which is steadily improving in size and quality of ore as depth is attained, can be rapidly followed to great depth; and the Bruce and Burgess veins in the same mine, which yielded their millions above the 400-ft. level, will, doubtless, reveal vast treasures below the water line. This will also necessitate the erection of additional mills.

The Noondays, on the south end, are prospectively as good as the Standard and Bodie, and the Concordia and Oro, both adjoining the north Noonday, are showing strong veins of rich silver ore. This group is also troubled with water, of which they will soon be relieved by the powerful pumping machinery now being put in position at the Red Cloud shaft. This shaft is being sunk with the greatest possible rapidity and will be driven to great depth, the intention being to make it the sump of the south end. The Noondays have two great ore veins, both rapidly improving as they descend, and sinking will be resumed as soon as the Red Cloud pump relieves them of water at the depth already attained, about 560 ft.

Within a few months the Red Cloud and Lent shafts will have attained sufficient depth to enable work to be prosecuted through them. In the meantime there is sufficient ore above the water level to keep all our mills running steadily for years. We believe that below that line greater mints will be found to exist than above, and that that belief is shared by those who have the largest interests in Bodie is evidenced by the extensive and expensive operations in progress to work at great depths.—Free Press.

**NEVADA COUNTY MINES.**—In order to show the extent of the mining industry in this county we desire to call attention to the fact that Hartwell's new map of Nevada county shows 342 claims, which represent the greater portion of the valuable mineral properties already discovered. Of this number 113 are gold quartz and 229 are gravel. There are also several valuable copper and iron mines in the county. The total assessed values of mining properties are as follows: Mining claims and improvements, \$2,353,640. Mining ditches and improvements, \$1,051,495. Total number of mining ditches, 217, having a total length of 824 miles. There are 44 quartz mills, having 503 stamps.—Transcript.

**THE OLD MINING RECORDS.**—F. H. McAllister is engaged in copying for the United States Geological Survey, the old laws of Nevada county and the names of locations made in Grass Valley district prior to 1854, as set forth in the pioneer records still on file at the County Recorder's office. Among the names given by the early prospectors to the leads and localities mentioned are some rather amusing ones, such as Sebastopol, Poverty lead, Good Time Coming ledge, Poppy Squash Hill, Mary's Diggings, Carhuncle Hill, Cave In Hill, etc.

**MINING LOCATIONS.**—The number of mining claims located in Nevada county during the year 1880 are shown by the County Recorder's books to be as follows: January, 48; February, 34; March, 56; April, 31; May, 26; June, 39; July, 45; August, 40; September, 45; October, 31; November, 22; December, 21. Total locations for year, 438.

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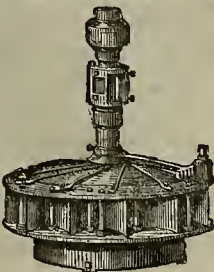
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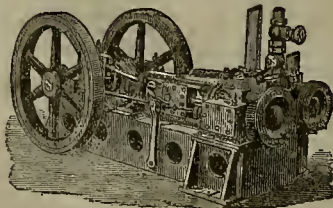
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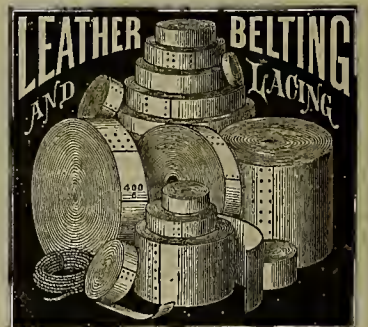
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

For the Week Ending December 23rd, 1880.

235,852.—CAR TRUCK.—W. T. Browne, Stockton, Cal.  
235,136.—SWITCH.—Jannaro S. Clements, S. F.  
235,939.—STOVE.—C. H. Dunton, S. F.  
235,872.—ORE FEEDER.—J. Hendy, S. F.  
235,965.—SINKING TUBE.—Harvey R. Leonard, S. F.  
235,065.—PRESERVED WOOD.—H. G. Muller, S. F.  
235,390.—GANG PLOW.—Christian Meyers, S. F.  
235,894.—STEAM PAVING.—Geo. C. Phillips, Silver City, Nev.  
235,967.—LEVER.—N. Sewell, Marysville, Cal.  
235,871.—EXPLOSIVE COMPOUND.—Wm. Heick, S. F.  
Note.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**METHOD OF RELIEVING RIVER CHANNELS OF SEDIMENT AND FORMING LEVEES.**—Newton Sewell, Marysville, Yuba Co., Cal. Patented Dec. 23, 1880, No. 235,967. This method is for relieving the channels of water courses from the sediment which may be brought down by the water, and for utilizing the same in the formation of levees upon each side of the stream, to aid in the reclamation of the land; and it consists of a dam or dams built across the stream, and having flumes or ground cuts leading out therefrom to the banks of the stream below. At suitable points upon the banks of the stream, below the dam or dams, a succession of inclosures are formed, of earth, either loose or in sacks, or other material formed in any suitable manner, so that the water from the flumes may be led into them and the sediment contained in the water allowed to settle, the water being drawn off and allowed to flow back into the stream. When the first inclosures have been filled with the sediment, the flumes are allowed to discharge into the next inclosures, and the levee may thus be built of any desired length, width and height. By adding to the inclosing walls and filling the new space, any height may be attained.

**COOKING STOVE.**—Charles H. Dunton, Oakland, Cal. Patented Dec. 23, 1880, No. 235,939. This invention relates to certain improvements in that class of portable stoves or ranges which are employed for the purposes of cooking, and in which two ovens and a single fire place are used; and it consists in the novel construction of an oval or similarly shaped outer case, having a centrally located adjustable cylindrical fireplace with independent ovens and cooking compartments upon either side, with flues and dampers, whereby either one or both sides may be employed with the same fire simultaneously or independently. This stove is simple, inexpensive, occupies but little space, while having large capacity; and the fire and amount of space may be regulated for the work to be done.

**PROPOSED ARCTIC EXPEDITION.**—A *Tribune's* New York special says: A short time ago Lieut. Schwatka received a communication from Commander Chenet, of the British Royal navy, a distinguished Arctic explorer, proposing an international polar expedition, and inviting his co-operation. The letter was accompanied by similar recommendations signed by many of the most prominent British officers who have participated in Arctic explorations, or made them the subject of study. In it was also a suggestion inviting American capital from private sources in the enterprise. Capt. W. Parker Snow, of the British Mercantile Marine, who was one of the early searchers for the lost crews of the *Erebus* and *Terror*, has also written a letter to Lieut. Schwatka, asking his co-operation in another expedition. Capt. Snow proposes to get up a new search by Lancaster sound westerly, then back to the magnetic pole, for any further information of Franklin's party, and afterward going through to Behring's straits.

**BUSINESS AT THE PORT OF WILMINGTON.**—Following is a statement of the number of vessels arriving and the amount of freight received at the port of Wilmington for the year of 1880: Steamers, 106; sailing vessels, 127; merchandise, 13,230 tons; lumber, 13,031,559 ft.; coal, 25,859 tons; railroad ties, 494,101; shingles, 550,000; barley, 150 tons; telegraph poles, 2,000; lime, 415 barrels. This is an artificial harbor, the only one on the coast.

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### Our Home Industries.

#### Herman Royer's Belting Factory.

Few of our readers have a definite idea, much less a just conception, of the quantity of belting used for the various machine purposes on this coast; or the amount of capital, time and labor involved in its manufacture. The special purposes to which belting is put in a large machine shop are multifarious. Not only is it instrumental in the direct transmission of power, but it has almost wholly superseded gearing for the increasing and diminishing of velocity, for changing positive into negative motion, and for pulley purposes. Its almost noiseless operation, non-friction property, and consequently entire emancipation from the necessity of lubricating agents, have caused it to become one of the great essentials in the mechanical operations of the world's machinery.

The manufacture of leather belting, rawhide rope, lacing, etc., in this city, is quite extensive. The factory of Mr. Herman Royer, Nos. 855, 857, 859 and 861 Bryant street, corner of Park avenue, between Fifth and Sixth streets, is one of our most promising home industries.

This business is carried on in a large building 75 ft. long by 50 ft. wide, and four stories high, and utilizing four full lots. On the premises is an artesian well which supplies the whole establishment with an abundance of the purest water. A 20-horse power steam engine drives the machinery, while a force of 12 men is required to manipulate the work. The whole business necessitated an investment of over \$60,000. Mr. Royer devotes his personal attention to the selection and purchasing of green hides, ships them to Santa Clara and Santa Cruz, where they are carefully and expressly tanned for the purpose with none other than California oak bark.

The "fulling process" is something entirely original, having been brought into being through the inventive faculty of Mr. Royer himself. As the term implies, the hides, while in a green condition, are subjected to a peculiar mechanical operation, which as actually and thoroughly fulfills them, as cloths fresh from the looms are filled in all our woolen factories. It will be readily understood, even by the uninitiated, that hides treated in this way will become wonderfully soft, flexible and pliable. Every fiber in the original tissue is brought into due play, and finds its own commensurate bearing.

The special advantages of this fulling process are best seen and appreciated in the manufacture of rawhide, belting and lacing, a great variety of which is turned out and shipped abroad from this establishment.

Mr. Royer tells us that his best hides come from Oregon and Washington Territory; a compliment which should be justly appreciated by our northern farmers and stock raisers. The trade-mark adopted by Mr. Royer is about as unique as it is expressive. It represents a Mexican ranchero on his "broncho" pursuing a wild bull which is running for dear life, but whose hide is wanted to subserve the purposes of civilization.

The fulled rawhide rope above mentioned is a specialty. It is manufactured round, solid and twisted, and of sizes ranging all the way from one-half to an inch in diameter.

The standard, oak-tanned leather belting is made from 1 to 30 inches wide. Every belt bears on each second joint the manufacturer's name and trade-mark, together with the word "Standard." The variety called "Short Lap" belting, is made from oak-tanned hides, discarding the shoulder part of the hide, which goes into the Standard belting, where it forms the "long laps."

As in other departments of the work, the green hides are carefully selected and tanned for this purpose. Every second joint of this, also, bears the maker's name, trade-mark, and the words "Short Lap."

Still another variety, called the "Combination," is essentially a most durable belting. One side of this is made of oak-tanned leather, while the other consists of rawhide made pliable by the process already alluded to above. The object to be attained by this double belting, is to effect a certain compensation rendered necessary in all heavy machinery, the minutiae of which are fully understood by all experienced millmen.

Mr. Royer has been 13 years in working up this business. He is a live man in the truest acceptance of the term, and exactly the right man in the right place. So well known and appreciated are his goods that he is surfeited with orders from the East, the West, the North and the South. For more full particulars regarding this establishment, we refer our readers to Mr. Royer's printed catalogue, which gives a more detailed account of this important industry.

**SCIENTIFIC PRESS.**—On New Year's day the S. F. SCIENTIFIC PRESS entered upon its XLII volume. The topics treated by this journal commend it to all classes—miners, artisan, mechanic, agriculturist, professional and business man.—*Bridgeport (Mono county) Chronicle*.

The License Collector reports that he has paid to the State Mining Bureau \$3,520, under the act of the Legislature providing for a 10-cent tax on certificates of transfer of mining stock for the last quarter.

### California as a Cotton State.

There is reason to believe that California has a future both in cotton growing and cotton manufacturing. The cotton grown last year was quite satisfactory to the growers and to purchasers, and it was quickly taken in the place of southern cotton which has hitherto been imported by our makers of "all wool" fabrics. It is a matter of note that Prof. Hilgard, who is superintending the cotton department of the census of 1880, found such quality in the samples grown here and such adaptation in his study of our conditions of soil and climate that he assures us that California will be treated as one of the virtually, if not actually, cotton-growing States in the work and publications of this tenth census. In a recent note to the *Bulletin* Prof. Hilgard assigns these reasons for concluding that California is fitted for a cotton-growing State and will be benefited by it:

I have during the past season investigated fully the question of cotton production in various parts of California, and I am satisfied that from Napa down to San Diego, an excellent staple can be grown. The best varieties of seed remain to be determined yet, and it is to be hoped that this will be done promptly and systematically. What renders this culture of especial importance to California is the fact that, being a deep-rooted plant and requiring summer cultivation, it can be successfully grown in lands too alkaline to be permanently available for cereal culture, as is largely the case at the head of the San Joaquin valley. Furthermore, unlike cereal culture, cotton-growing can easily be made to improve instead of impoverishing the soil, by inaugurating at the onset the simple system of return to the land, by giving back the seed-cake. The lint of cotton takes so little plant food from the soil that this simple restoration is, in all practical respects, a permanent one. I am satisfied that when the merits of this culture once come to be generally understood, not one but a dozen cotton mills will be wanted to furnish a market for the product.

There is reason to expect the speedy equipment of a cotton mill in this city. The daily papers have printed accounts of the plans of Mr. J. W. Tripp, a practical cotton manufacturer, who proposes to carry out the enterprise. Mr. Tripp assures the reporters that the project is received with much favor, both by the capitalists and the working classes, who desire moderately remunerative employment for their young people. He thinks he can find abundant hands among the white youth and will not invoke mongolian aid. Property owners look upon the beginning of cotton manufacturing in this city as likely to advance their interests, and certainly farmers will be pleased to grow cotton if they can be shown a profit in it.

Mr. Tripp's views upon the subject of cotton-growing and its relation to our general prosperity and advancement as a State are certainly forcible. He believes he could import cotton from the south by the railroad soon to be opened and manufacture it at a profit, but he hopes to get California-grown material. He points to the valley of the San Joaquin, 300 miles in length by about 50 in width, which ought to be one vast cotton field, because of its peculiar adaptation to that product, and yet we send abroad for the hags to put our flour in. This is all wrong. The State will never see its highest prosperity until we learn to grow the raw material which will least impoverish the soil, and then work up that raw material here at home into fabrics which everybody uses, and give employment to our labor, growth to the city and a home market to our farmers. Mr. Tripp believes this State offers peculiar advantages for cotton manufacturing and especially great if we grow the raw material. Massachusetts brings all her raw cotton from the Southern States and grows rich at manufacturing, in spite of a most bitter winter climate for nearly half the year. We are one of the contributors who enrich that State, and yet we can grow the cotton in California, and have on this peninsula the very best climate in this world for the manufacture of it.

There certainly seems every reason for the uprising of the cotton industry in this State. The growing is certainly going forward. Haggin & Carr raised last year in Kern county about 200 bales of cotton, and are intending to raise from five to ten thousand bales this year. Unless we establish cotton manufacturing, that cotton will be sent away just as hides and wool are, and then brought back to us at enormously enhanced prices in the shape of coarse cotton clothes. Mr. Tripp proposes to put a stop to that ruinous process by erecting a large cotton factory and working up that cotton right here in San Francisco, by employing the men and women, boys and girls of this city who are waiting and hoping for employment. We trust his looms will soon be humming.

BEN WOODS, an old resident of Pioche, returned from Tombstone last Saturday. He says there are a number of excellent mines down in that country, containing large bodies of rich ore, but that the country is fearfully overdone, there being from five to seven men to every job, and streams of men constantly flowing in from all directions. It is no place for a man in search of employment to go.—*Pioche Record*.

The New York *Tribune* has made a discovery that the business of mining stock dealing may decline while mining as a productive industry is prospering. The stock sharps on this coast have never been able to make this subtle distinction. They have always imagined that the "mining industry" of California had no existence outside of Pine street.

### News in Brief.

CORN product of Los Angeles county for 1880, 800,000 bushels.

The fire insurance companies report a poor business during the year.

LATER advices do not confirm the report of the capture of Lima by the Chileans.

APPEALS are being made in New York for the relief of colored refugees in Kansas.

It is reported that the Western Union and American Union telegraph companies have been united.

THERE were 937 patients—596 males and 312 females in the Napa Insane asylum on December 31st.

BONANZA CITY promises to be the liveliest mining camp in Idaho this spring. Five new mills are already promised.

O'LEARY has accepted Sir John Astley's challenge to furnish a pedestrian to walk against Rowell for \$10,000.

DIPHTHERIA is prevailing to an alarming extent in portions of Yamhill county, Or., and a number of deaths are reported.

THE total indebtedness of San Benito county on January 1, 1881, was \$456,387.29. Of this amount \$369,065.60 are in bonds.

ON Friday, at Reno, Nevada, a man named Antone Astroden accidentally cut off his foot at the instep while chopping wood.

It is understood that Justice Swayne will retire from the Bench next week, and that he will be succeeded by Stanley Matthews.

THE Indian Appropriation bill was passed by the House yesterday, but the Board of Indian Commissioners was lopped off as a needless excrescence.

THE cold weather at Chihuahua surpasses any thing of the kind within the memory of the oldest inhabitant. There has been ice in Paso del Norte two inches thick.

THE house of a Protestant minister residing in Jalapa, having been stoned by fanatics, the government immediately took measures for the punishment of the offenders.

THE syndicate in Calcutta formed last summer for the purpose of introducing Indian tea into the Austrian market has resolved to extend its operations to the United States and Canada.

JESSE T. BOWLES, a farmer of Clark county, W. T., while hutchering a calf a short time since, was kicked by the animal on the hand which held his knife, and the blade was driven four inches into his thigh.

LAST Sunday three Indians shot at two Chinamen near the mouth of the South Yuba, half a mile below Bridgeport. One Chinaman was instantly killed, the other escaped without injury. The Indians were arrested.

THE New York World's Fair Commission report that generous subscriptions are being made. Mayor Grace welcomed the members of the Commission to the city. An address setting forth the object of the Commission is issued.

THE scheme for the construction of the Grand Eastern railroad from Pesth through Belgrade to Constantinople, under international auspices, has been submitted to the Austrian and Serbian governments, and to a great London financial firm.

THE Fenian scare has extended to Portsmouth. The authorities have received anonymous warnings of contemplated attacks on Government establishments. They do not attach much importance to the warning, yet have taken some extra precaution.

DR. MEARES, the Health Officer, having notified the trustees of the Free Public Library that the small-pox epidemic has materially diminished, and that the library need no longer be closed for circulation, it has again been opened for the circulation of books as usual.

THE United States Consul in Venezuela informs the Department of State that he is trying to organize a scientific and commercial exploring expedition of Americans to visit Venezuela. He regards the opportunity for American merchants in that country as very good.

THE New York *Times*, regarding the meeting of the World's Fair Commission: "It is not easy to see how an organization originated as this was, and conducted as it has been up to this time, is to be brought readily into effective working order for so gigantic a task as it is struggling with."

A WRITER in the New York *Sun* says General Grant will probably start for Mexico within the next 30 days for the purpose of obtaining accurate information, and forming an opinion as to several concessions for the benefit of the Consolidation Committee of the Mexican railway, of which he is a member.

A HOLLAND correspondent writes that the suggestion of Rotterdam newspapers, that members of the Red Cross be dispatched to the Transvaal to aid the wounded Boers, has been received with lively sympathy. A subscription is talked of for the purpose of starting some surgeons immediately for the Transvaal.

OUR Consul at Maracaibo, Venezuela, in a dispatch to the State Department, says he is trying to organize a scientific and commercial exploring party in the United States to visit Venezuela this winter for the double purpose of seeing the country and people, and examining the interior water courses, with a view to utilize them by a system of canals for inland transportation. Inasmuch as the United States occupies a foremost place in Venezuela markets, and can extend its trade indefinitely with proper effort, it is urged that it is important our merchants should become conversant with the country and its needs.



## The Californian.

THE RISING MONTHLY OF THE DAY. YEARLY SUBSCRIPTION \$4. Single number 35 cents. **AGENTS WANTED** in every town and village of the United States to canvass for this popular magazine. The most liberal commissions will be paid to responsible parties. This is a chance to make money at your own home. Address

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(P. O. Box 2319) 202 Sansome St. S. F.

## Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St. S. F.

## Various Causes—

Advancing years, care, sickness, disappointment, and hereditary predisposition—all operate to turn the hair gray, and other of them incline it to shed prematurely. **AYER'S HAIR VIGOR** will restore faded or gray, light or red hair to a rich brown or deep black, as may be desired. It softens and cleanses the scalp, giving it a healthy action. It removes and cures dandruff and humors. By its use falling hair is checked, and a new growth will be produced in all cases where the follicles are not destroyed or the glands decayed. Its effects are beautifully shown on brashy, weak, or sickly hair, on which a few applications will produce the gloss and freshness of youth. Harmless and sure in its operation, it is incomparable as a dressing, and is especially valued for the soft luster and richness of tons it imparts. It contains neither oil nor dye, and will not soil or color white cambric; yet it lasts long on the hair, and keeps it fresh and vigorous.

FOR SALE BY ALL DEALERS.

THE AMERICAN EXCHANGE hotel, so well known to all the traveling public, has been refitted, overhauled and put in first rate condition, and is now under the management of Charles Montgomery, proprietor of the three "Montgomery Hotels" on Second street, in this city. He is an old hotel man, having had many years experience. He will run the American Exchange on improved principles. The building has been thoroughly renovated.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has now varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Chew JACKSON'S BEST Sweet Navy Tobacco

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

## DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company.

SAN FRANCISCO, JANUARY 10, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Thirty-Nine (39), of Fifty (50) Cents per share, was declared payable on Saturday, January Fifteenth (15), 1881. Transfer books closed on Wednesday, January Twelfth (12), 1881, at 3 o'clock P. M.

WM. WILLIS, Sec'y.

Office—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

## DIVIDEND NOTICE.

OFFICE OF THE

Western Mining Co. (Contention Mine.)

SAN FRANCISCO, JANUARY 8, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 8) of Seventy-Five (75) Cents per share was declared, payable the Tenth (10) instant.

D. C. BATES, Sec'y.

Office—Room 79 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

## DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,

SAN FRANCISCO, DECEMBER 31st, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Twenty-four (24), of Seventy-five (75) Cents per share, was declared payable on Wednesday, January Twelfth (12), 1881, at the office in this city, or at the Agency of The Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.

Office—Room No. 29 Nevada Block, No. 309 Montgomery Street, San Francisco, California.

## DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company,

SAN FRANCISCO, JANUARY 4th, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 13) of Twenty-five (25) Cents per share was declared, payable Saturday, January Fifteenth (15), 1881, at the office of the Company, room 10, No. 323 Montgomery Street, San Francisco, California. Transfer books will be closed January Eighth (8), 1881.

JOSEPH NASH, Sec'y.

## DIVIDEND NOTICE.

The German Savings and Loan Society.

For the half year ending this date, the Board of Directors of The German Savings and Loan Society has declared a dividend on Term Deposits at the rate of five and two-fifths (5-2/5) per cent. per annum, and on Ordinary Deposits at the rate of four and one-half (4-1/2) per cent. per annum, free from Federal Taxes, and payable on and after the fifteenth (15th) day of January, 1881. By order, GEORGE LETTE, Sec'y. San Francisco, December 31, 1880.

## DIVIDEND NOTICE.

San Francisco Savings Union,

532 California Street, corner Webb.

For the half year ending with thirty-first (31st) December 1880, a Dividend has been declared at the rate of five and two-fifths of one (1) per cent. (5-2/5) per annum on term deposits, and four and one-half (4-1/2) per cent. per annum on ordinary deposits, free of Federal tax, payable on and after Monday, seventeenth (17th) January, 1881.

LOVELL WHITE, Cashier.

**Blue Bird Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Globe District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Eighth (8) day of January, 1881, an assessment, No. one (1), of Five (5) Cents per share was levied upon the capital stock of the corporation, payable immediately, in U. S. gold coin, to the Secretary, at the office of the Company, No. 10 Market Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Fourteenth (14) day of February, 1881, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Fourteenth (14) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

W. H. KNIGHT, Sec'y.

Office No. 10 Market Street, San Francisco, Cal.

## Metals.

(WHOLESALE.)

WEDNESDAY M., Jan. 12, 1881.

IRON.—		
American Pig, soft, ton.....	32 00	@ 33 00
Scotch Pig, ton.....	26 00	@ 27 00
American White Pig, ton.....	—	@ —
Oregon Pig, ton.....	—	@ —
Refined Bar.....	4 1/2	@ 8
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ 94
Norway, according to thickness.....	8 1/2	@ 95
STEEL.—		
English Cast, lb.....	16	@ 18
Black Diamond, ordinary sizes.....	13	@ 15
Drill.....	9	@ 10
Flat Bar.....	—	@ 16
Plow Steel.....	9	@ 10
COPPER.—		
Ingot.....	—	@ 52
Sheet.....	—	@ 30
Sheathing Tinned 14x18.....	—	@ 42
Nails.....	—	@ —
Bolts.....	38	@ 42
Old.....	—	@ 18
Bar.....	22	@ 22
Precipitate, 100 fine.....	18	@ 19
LEAD.—		
Pig.....	4 1/2	@ 5
Bar.....	—	@ 6
Pipe.....	—	@ 9
Pipe, Soft.....	—	@ 9
Shot, Discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Brick.....	—	@ 2 50
Chilled ".....	—	@ 2 50
TIN PLATES.—		
10x14 I O Charcoal.....	—	@ 10 50
10x14 I O Coke.....	—	@ 10 00
Banana Tin.....	—	@ 10 00
Australian.....	—	@ 20 00
I. C. Charcoal, Roofing 14x20.....	—	@ 10 00
20x28.....	20 00	@ 21 00
ZINC.—		
By the Osk.....	—	@ 10
Zinc Sheet 7x3 ft. 7 to 10, lb. less than osk.....	10 1/2	@ 11
NAILS.—		
Assorted sizes.....	4 00	@ 4 75

## Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO &amp; Co.]

SAN FRANCISCO, Jan. 12, 5 P. M.

SILVER, i  
GOLD BARS, \$90@910. SILVER BARS, 10@11 1/2 cent. Is-jont.  
Exchange on New York, 12 1/2 @ 15, on London bankers, 49 1/2 @ 49 1/2. Commercial 60; Paris, five francs \$ dollar; Mexican dollars, 89@90.  
LONDON Consols, 98 1/2-118; Bonds (4 1/2), 116 1/2.  
QUICKSILVER in S. F., by the Osk, \$ 42 1/2 @ 45c. lb.

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CHAS. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer.

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PATENTS obtained promptly; Caveats filed expeditiously; Patent Reissues taken out Assignments made and recorded in legal form; Copies of Patents and Assignments procured; Examinations of Patents made here and at Washington; Examinations made of Assignments recorded in Washington; Examinations ordered and reported by Telegraph; Rejected cases taken up and Patents obtained; Interferences Prosecuted; Opinions rendered regarding the validity of Patents and Assignments; Every legitimate branch of Patent Agency Business promptly and thoroughly conducted.

Our intimate knowledge of the various inventions of this coast, and long practice in patent business, enable us to abundantly satisfy our patrons; and our success and business are constantly increasing.

The shrewdest and most experienced Inventors are found among our most steadfast friends and patrons, who fully appreciate our advantages in bringing valuable inventions to the notice of the public through the columns of our widely circulated, first-class journals—thereby facilitating their introduction, sale and popularity.

## Foreign Patents.

In addition to American Patents, we secure, with the assistance of co-operative agents, claims in all foreign countries which grant Patents, including Great Britain, France, Belgium, Prussia, Austria, Baden, Pern, Russia, Spain, British India, Saxony, British Columbia, Canada, Norway, Sweden, Mexico, Victoria, Brazil, Bavaria, Holland, Denmark, Italy, Portugal, Cuba, Roman States, Wurtemberg, New Zealand, New South Wales, Queensland, Tasmania, Brazil, New Granada, Chile, Argentine Republic, AND EVERY COUNTRY IN THE WORLD where Patents are obtainable.

No models are required in European countries, but the drawings and specifications should be prepared with thoroughness, by able persons who are familiar with the requirements and changes of foreign patent laws—agents who are reliable and permanently established.

Our schedule price for obtaining foreign patents, in all cases, will always be as low, and in some instances lower, than those of any other responsible agency.

We can and do get foreign patents for inventors in the Pacific States from two to six months (according to the location of the country) SOONER than any other agents.

The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more correctly judge of the value and patentability of inventions discovered here than any other agents.

Situated so remote from the seat of government, delays are even more dangerous to the inventors of the Pacific Coast than to applicants in the Eastern States. Valuable patents may be lost by extra time consumed in transmitting specifications from Eastern agencies back to this coast for the signature of the inventor.

## Confidential.

We take great pains to preserve secrecy in all confidential matters, and applicants for patents can rest assured that their communications and business transactions will be held strictly confidential by us. Circulars free.

## Home Counsel.

Our long experience in obtaining patents for inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing to them the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applicants which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money, but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency.

## Engravings.

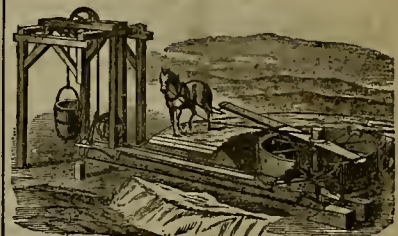
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United States and Foreign Patent Agents, publishers Mining and Scientific Press and the Pacific Rural Press, 202 Sansome St. N. E. corner Pine, S. F.

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One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

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Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasmeters, Girders, Bridges and Iron Ship Building.

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Repairing promptly attended to at the lowest possible terms.

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Kinds of Machinery for Mining Purposes.

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### Golden State & Miners Iron Works,

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

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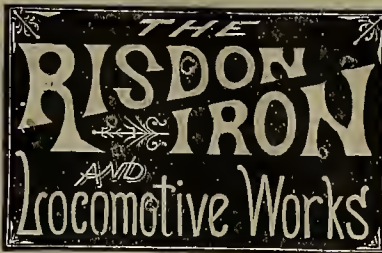
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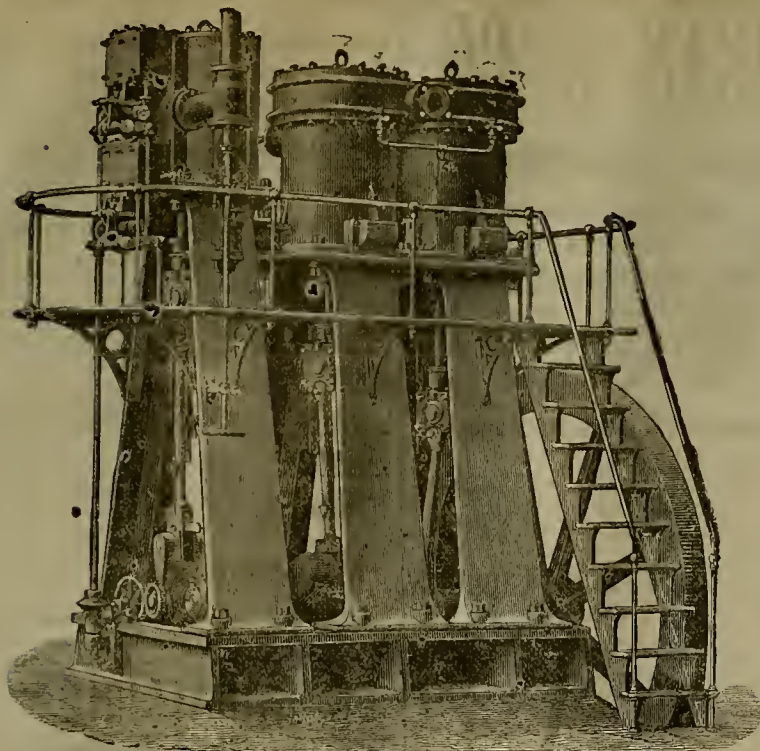
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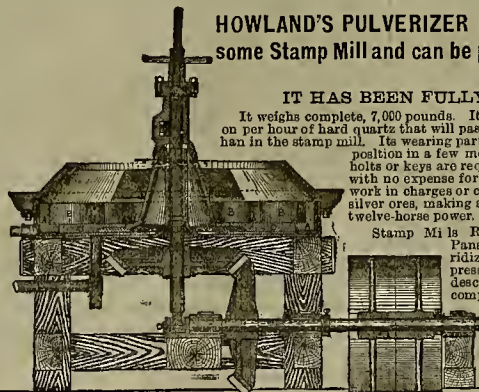
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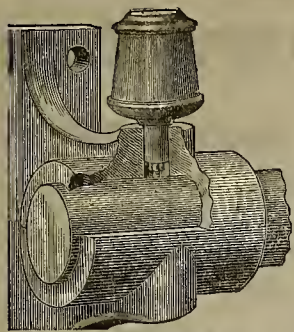
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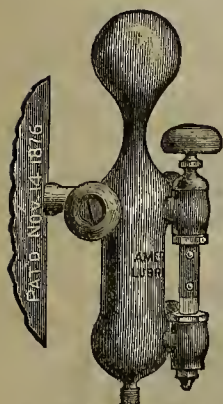
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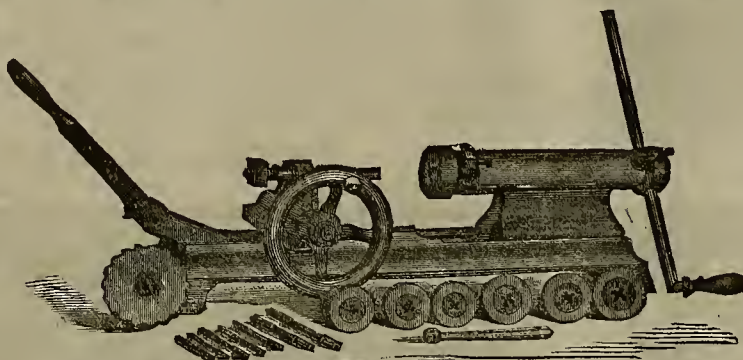
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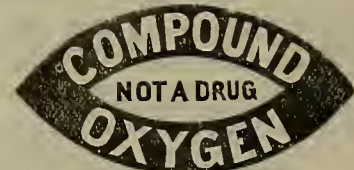
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An Illustrated Journal of Mining, Popular Science and General News.

BY LEWIS & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 24, 1881.

VOLUME XLII  
Number 4.

## A Timber Framing Machine.

Isaac Lepley, of Amador City, Amador Co., has recently invented a novel piece of mechanism, which is intended for the framing of timbers of all kinds, which are to be joined together. One of the machines is now in operation at the Keystone Con. mine, Amador. We present an engraving of the machine on this page.

The invention consists in the employment of a cutter head or heads, which are caused to rotate upon a suitable frame, and this frame is moved both vertically and horizontally by means of slides and guides, so that the cutters may be carried across the timbers upon either one or all four sides to form a tenon, dovetail, or other cut; and if desired, a round tenon may be formed by the use of a link which has one end fixed to the frame, so that the slides will move in a manner to carry the tool around in a circle.

In the engraving, *A* represents the cutter head, which is caused to rotate upon its shaft by a belt to the pulley, *B*, so that the cutter acts as a planer. It may be of sufficient height for the tenon to be cut, or by moving the timber or carriage the length desired may be cut at two or more operations. Its shaft is journaled at the top of a frame, *C*. This frame is moved up and down in guides upon the frame, *E*, by means of friction rollers, *F*, which press against a vertical central bar, *K*, which extends parallel with the frame, *C*. These rollers, *F*, are driven by pinions upon their shafts, and a hand wheel or other device upon a main shaft at the end of the machine, as shown.

The frame, *E*, is also adapted to move horizontally upon the main frame, *G*, by means of similar gearing to that which moves the frame, *C*, and by these two motions, it will be seen that the cutters may be moved in any direction. The log is laid upon a carriage with its end near the frame, and its height is so adjusted, that when the frame, *E*, is moved across horizontally, the revolving cutters will be carried across, so as to make a cut to the depth desired.

The frame, *C*, is then moved downward, and the cutters will cut the vertical face upon one side. The frame, *C*, then remains stationary, while the frame, *E*, is moved horizontally backward upon the guides on the main frame, and the cutters will complete the lower part of the tenon. The frame, *E*, is then held stationary and the frame, *C*, is again moved upward, so that the cutters will be carried upward across the remaining side, and the tenon will be finished.

The cutters are blades secured to a head similar to those used upon planer heads, but in order to make the vertical cut at the inner end of the tenon so that it will present a clean, square surface, sliding plates are fitted to move in grooves on the end of the planer head. Their outer ends are toothed, or formed so as to make the proper cut, and they are held in place by set screws.

In order to allow the cutter shaft and its driving pulley to move in the directions and to the distances as described, the belt which drives it is carried over tightening pulleys, suitably arranged in sliding frames with weights.

The tenons here described are those which are usually made upon the ends of the timbers used in timbering up mines. The timbers are united, and these tenons allow the timbers to be properly set together. It will be obvious, however, that this apparatus may be employed to make any kind of a cut on a timber or to square up the ends of timber, as the cutter may be moved in any direction required.

Upon the end of the cutter shaft opposite the planer head is a peculiarly shaped boring and cutting tool, *J*, which is intended to form mortises either in the sides or ends of timbers. The end of this tool is nearly flat, but is provided with a cutting bit, which enables it to enter the timber as far as may be desired.

The sides of the tool (which is cylindrical in shape) are cut away so as to form an enclosed cutting edge, and after it has entered the timber far enough to give the required depth, the frame, *E*, may be moved upon the frame, *G*, where the side cutter will cut away the wood until the mortise is as long as desired. The same style of cutter may be employed to form what is termed the boxing, or the depression which is cut across the timber equal to the length of the

mortise, to receive the foot of the timber which is tenoned to fit the mortise.

The tenon to fit the mortise is formed by the cutter, *A*, in the same manner as has been described, except that the ends must be rounded to fit the ends of the mortise, which may be left curved by the tool, *J*. In order to make these rounded ends to the tenon, it is necessary to produce a compound motion of the two frames, *C* and *E*, one which, as before described, moves vertically, while the other moves horizontally.

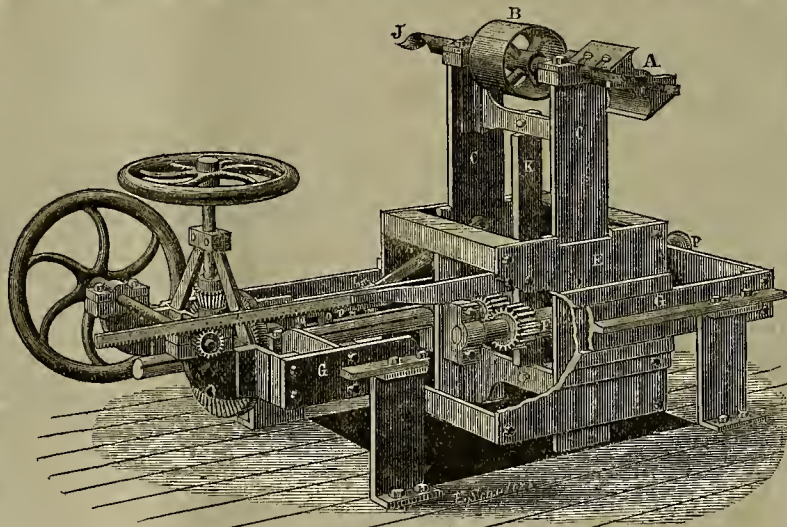
This compound motion is produced by the aid of an arm, *K*, which has one end pivoted to this side of the vertically moving frame, *C*. The opposite end is adapted to slip into a slot in a block, *L*, which is pivoted to a slide, *M*, this slide moving in a slot in the bar, *N*, which extends from end to end of the frame, *G*, and inside the frames, *E* and *C*. Two stops, *O*, are fitted to be moved to or from each other by the long right and left screw, *P*, these stops having projections which enter the slot in the bar, *N*, and they serve to limit the motion of the slide, *M*, and block, *L*. When a tenon is to be made with rounded ends, the bar or arm, *K*, is slipped through the slot in the block, *L*, and is secured by a set screw. This arm is secured at a dis-

so as to produce a compound movement, the resultant of which will be to form a cylindrical tenon.

This machine is applicable to work upon any form of timber and make any kind of a cut. The tool, *J*, may be made with cutters which can be detached, to be sharpened or renewed. Mr. Lepley, who may be addressed for further information at Amador City, has applied for a patent for his invention through the MINING AND SCIENTIFIC PRESS Patent Agency.

## A Double-Breast Steam Wheel.

We saw at the National Iron Works this week, a new form of rotary engine invented by Henry Thibault and Thomas Hawkins, of this city, who have applied for a patent for their device through the MINING AND SCIENTIFIC PRESS Patent Agency. The machine we saw at work is a small one, the whole engine, fly-wheel and all only weighing 250 lbs., and the fly-wheel weighs 140 lbs. of that. The same inventors patented a rotary engine in August last, and this is an improvement on the previous patent.



LEPLEY'S MACHINE FOR FRAMING TIMBERS FOR MINES.

tance from the point about which the arm turns, equal to half the thickness of the proposed tenon added to the whole diameter of the cutter head, as the latter must pass all around the tenon.

The stops, *O*, are adjusted by turning the screw, *P*, until they are at a distance apart equal to the width of the tenon to be made, plus the diameter of the cutter head.

The operation will thus be as follows: The frame, *C*, being set at a point which will allow the cutter to form the top of the tenon, the frame, *E*, is moved horizontally upon the main frame, *G*, until the slide, *M*, has moved the distance between the stops, *O*. This carries the cutter across the top of the tenon to the point where the curve of one side or edge commences. From this point the frame, *C*, is moved downward, and the frame, *E*, horizontally, the arm, *K*, acting as the radius or link to hold the frames in their relative positions and cutter to its work, until it has passed around the side and formed the curve at that part of the tenon. The arm, *K*, having then passed around its pivot to form a half circle, the frame, *C*, is allowed to remain stationary, and the frame, *E*, is moved along to allow the cutter to form the bottom of the tenon, the slide, *M*, moving the distance between the stops, *O*. From this point the curve at the opposite side of the tenon is formed in the same manner as before described.

If it is desired to form a complete cylindrical tenon, the stops, *O*, are curved up close to the slide, *M*, the block, *L*, having been secured to the arm, *K*, at a distance from the center pivot equal to half the diameter of the proposed tenon, plus the diameter of the cutter, and the frames, *C* and *E*, are then moved simultaneously,

The nacking of the joints between the edges of the drum and the case is effected by the use of a metal ring and a packing of hemp, inside of which is a ring which fits against the flange of the disk, while the other ring serves to press the hemp against the joint. This is ingeniously arranged, and makes a perfectly tight joint; so much so that the sides of the case are left open, as was the case with the engine we saw running this week.

The inventors intend to compound this engine by having a similar engine on the same shaft, with a larger area, and the exhaust steam from the small engine will pass into the larger one. This will admit of a very economical use of steam. This engine can be reversed instantly, by simply shifting the valve, rocker shaft, link motion, etc., being dispensed with. We are told that on account of the small amount of machinery required the engine can be made at less than one-half the cost of an ordinary engine of the same horse power. In construction there is very little hand work required, most of it being done with lathe and planer. All the wearing parts are so made as to be self-adjusting. The machine takes steam on opposite sides and there is therefore no special strain on the shaft at any part of the circle, because the pressure of steam is equal on all sides. It is really a double breast steam wheel. The parts are self-adjusting and can easily be replaced when worn. The inventors claim much less friction on this than on other engines, and say that experts acknowledge that from what they can see at present there is nothing that shows any more chance for wear than on any other ordinary engine. The machine uses a rotary cut off, and steam can be cut off at any desired point, the

same as with an ordinary engine. There are no dead points so there is no special limit to the speed. The engine can be instantaneously reversed, even when it is running fast. It is adapted for steam propellers and for hoists, but may be used for any ordinary purpose as well. The space it occupies is very small, and all the moving parts are enclosed in the case. This engine, which we will illustrate in a future number, may be seen at work, every afternoon, at the National Iron Works, corner of Main and Howard.

## The Quartz Mines of Placer County.

The Duncan Hill mines, about two miles west of Auburn, are all doing well. At the Conrad mine, the main shaft is now down 180 ft., and drifts at this point run both east and west on the ledge have struck shoots of high-grade milling rock, with occasional rich pockets of specimen rock. A second shaft 800 ft. east of the above is down 80 ft. in fair milling rock. The best mill-run of the ore averaged \$32 per ton.

The Hunter mine on the north end of the hill, located and opened within the last six months, is prospecting well. The ledge is parallel to the Conrad ledge, and similar to it. A shaft has been sunk on the ledge which is three ft. thick, and 150 ft. of levels run to prospect the ore body. A portion of the rock taken out in opening the mine, some 50 tons, was milled as an experiment, and yielded \$15 per ton. In addition, several hundred dollars' worth of rich specimens for jewelry were picked out. Probably what will be the best mine the gold-bearing quartz district around Auburn has developed is the Ohio, or Gold Blossom mine, owned by Messrs. Craig & Fulweiler, of Auburn. It is situated on the western slope of Crater hill, about two miles west of Ophir. The location covers 1,800 ft. on an east and west ledge that can be traced by croppings for two miles. Both walls are granite, the ledge standing nearly vertical between them. In width the vein varies from 30 to 60 inches, and while carrying some free gold which is rarely coarse enough to be visible to the eye, is principally enriched by the high percentage of auriferous sulphurets that it carries. Assays of the rock run all the way from \$40 to \$1,930 per ton. A quantity of rock hand sorted so as to contain but a small quantity of sulphurets worked \$16 and upward per ton in free gold. The ledge having only been located this last summer but little work has been done toward developing the property. One permanent working shaft down 80 ft., and several prospecting shafts and drifts have, however, exposed an ore body of several tons of high-grade rock. The recent decision of the Land Commissioner throwing open to mineral location under the U. S. mining laws school sections of mineral land patented to the State, will give quite an impetus to quartz mining around Auburn, a section of such land on which are many ledges, some known to be valuable, being only a mile distant from the town.

Several quartz mines in Humboldt mining district, one and one half miles west of Damascus, have been worked on a small scale with very encouraging results during the past summer. One of these, the Pioneer, is opened by a tunnel 287 ft. long, which cuts the ledge at a depth of 300 ft.; the ledge at this point is four ft. thick, and high-grade milling rock. From the old workings at a less depth on the ledge, 1,200 tons of rock were milled, and yielded at the rate of \$20 per ton.

High up in the mountains about 15 miles west of the summit, and far down in the almost inaccessible Sailor canyon, is another ledge which bids fair to develop into a mine. This vein, which varies in thickness from 7 to 13 ft., and dips at an angle of 45° to the northeast, has been prospected at several points by short tunnels which tap the ledge at considerable depths. Averaged assays made on samples taken from all points on the ledge yet opened indicate that the ore will mill about \$15 per ton.

OWING to a scarcity of coal, caused by a strike of the Lancashire miners, several mills and foundries have been stopped, and distress among the working classes is apprehended.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

### Stirring Roasting Ores.

EDITORS PRESS:—In your issue of the 8th inst., you give an illustrated extract from Kustel's work on roasting, describing a new style of wheel roller, on which to work the hoe in stirring the ore in a reverberatory furnace. I devised, but did not make the same roller in Mexico, in 1866, and think well of the plan; but it is proper to remark, that unless the roller is placed in the middle of the thickness of this wall, it will greatly diminish the range of operation of the hoe, necessitating a corresponding reduction of the hearth area, every part of which must be accessible.

If a roller were attached on the front of such a frame as that shown in your diagram, it is easy to see that the lateral movement of the hoe would be restricted to a comparatively small angle, and if the furnace had been built to be used with the ordinary roller, a considerable portion of the hearth would be inaccessible by a hoe resting on the new roller so attached.

This difficulty may be obviated by using two of the new rollers, one at each end of the door-frame, instead of the one in the middle. It would only be necessary to change the hoe from one roller to the other occasionally.

If, however, instead of attaching the roller outside, as shown in your diagram, a hole were drilled in the iron frame, in the middle of the thickness of the wall, and the swivel pin of the roller inserted therein, the hoe would have the same range as if the usual roller bar were used.

There is no difficulty in drilling such a hole by means of a lever and ratchet drill, the only question being whether the thickness of the casting would be sufficient to give stability to the arrangement.

You appear to slightly misapprehend your author when you say, "a wheel, which allows the hoe to be directed to the required points, which is not the case with roller bars." If I recollect rightly, Mr. Kustel does not make the latter statement. The roller bars admit of as great a range of movement of the hoe as it is possible to attain with the wheel, greater if the latter be attached to the frame as suggested. The trouble with roller bars is, that when the hoe handle is pushed, or pulled, while resting obliquely on the roller, the action of the latter tends to carry the handle toward one end or the other of the door frame. This is a trifling difficulty, and may be obviated by using stationary steel bars, in place of the roller bars. Such bars must be greased, and even then, necessarily wears the handle more than do the rollers or wheels.

C. H. A.

[The assertion made by our correspondent with reference to the sentence which says, "a wheel, which allows the hoe to be directed to its required points, which is not the case with the roller bars," is incorrect. We did not misapprehend our author but quoted him correctly, as our correspondent will see if he looks on page 68, of the work in question. Mr. Kustel's idea was probably that the roller bar allowed an oblique movement to the handle, so that it would rub against the inner edge of the door.—Eds. Press.]

### The Chinese Treaties.

Omitting the preambles which contain only the formalities usual to such documents, the following are the full terms of the treaties lately signed by the representatives of the Government of the United States and China:

#### The Immigration Treaty.

ARTICLE 1. Whenever, in the opinion of the Government of the United States, the coming of Chinese laborers to the United States, or their residence therein, affects or threatens to affect the interests of that country, or to endanger the good order of any locality within the territory thereof, the Government of China agrees that the Government of the United States may regulate, limit or suspend such coming or residence, but may not absolutely prohibit it. The limitation or suspension shall be reasonable, and shall apply only to Chinese who may go to the United States as laborers, other classes not being included in the limitation. Legislation in regard to Chinese laborers will be of such a character only as is necessary to enforce the regulation, limitation or suspension of immigration, and immigrants shall not be subject to personal maltreatment or abuse.

ART. 2. Chinese subjects, whether proceeding to the United States as traders, students or merchants, or from curiosity, together with their body and household servants, and Chinese laborers who are now in the United States, shall be allowed to go and come of their own free will and accord, and shall be accorded all the rights, privileges, immunities and exemptions which are accorded to the citizens and subjects of the most favored nations.

ART. 3. If the Chinese laborers, or Chinese of any other class, now either permanently or temporarily residing in the territory of the United States, meet with ill treatment at the hands of any other persons, the Government of

the United States will exert all its power to devise measures for their protection, and secure to them the same rights, privileges, immunities and exemptions as may be enjoyed by the citizens or subjects of the most favored nations, and to which they are entitled by treaty.

ART. 4. The high contracting powers, having agreed upon the foregoing Articles, whenever the Government of the United States shall adopt legislative measures in accordance therewith, such measures will be communicated to the government of China, and if the measures, as effected, are found to work hardship upon the subjects of China, the Chinese Minister at Washington may bring the matter to the notice of the Secretary of State of the United States, who will consider the subject with him, and the Chinese Foreign Office may also bring the matter to the notice of the U. S. Minister at Hongkong and consider the subject with him, to the end that mutual and unequal benefit may result. In faith whereof, the respective Plenipotentiaries have signed and sealed the foregoing at Peking, in English and Chinese, there being three originals of each text of even tenor and date, the ratification of which shall be exchanged at Peking within one year from the date of its execution.

Done at Peking this 17th day of November, in the year of our Lord, 1880, Kuang Hsi, sixth year, 10th moon, 15th day. Signed and sealed by the Commissioners of both Governments.

#### The Commercial Treaty.

ART. 1. The Government of the United States and China, recognizing the benefits of their past commercial relations, and in order to still further promote such relations between the citizens and subjects of the two Powers, mutually agree to give the most careful and favorable attention to the representations of either as to such special extension of commercial intercourse as either may desire.

ART. 2. The Governments of China and of the United States mutually agree and undertake that Chinese subjects shall not be permitted to import opium into any of the ports of the United States, and citizens of the United States shall not be permitted to import opium into any of the open ports of China, or to transport from one open port to any other open port, or to buy and sell opium in any of the open ports of China. This absolute prohibition, which extends to vessels owned by the citizens or subjects of either Power, to foreign vessels employed by them, or to vessels owned by the citizens or subjects of either Power, and employed by other persons for transportation of opium, shall be enforced by appropriate legislation on the part of China and the United States, and the benefits of the favored claims in existing treaties shall not be claimed by the citizens or subjects of either Power as against the provisions of this article.

ART. 3. His Imperial Majesty, the Emperor of China, hereby promises and agrees that no other kind or higher rate of tonnage dues or duties for imports or exports or coastwise trade shall be imposed or levied in the open ports of China upon vessels wholly belonging to citizens of the United States, or upon the produce, manufactures or merchandise imported on the same from the United States or from any foreign country, or upon the produce, manufactures or merchandise exported in the same to the United States, or to any foreign country, or transported in the same from one open port of China to another, than are imposed or levied on vessels or cargoes of any other nation, or on those of Chinese subjects. The United States hereby promises and agrees that no other kind or higher rate of tonnage duties or dues for imports shall be imposed or levied in the ports of the United States upon vessels wholly belonging to the subjects of his Imperial Majesty, coming either directly or by way of any foreign port from any of the ports of China which are open to foreign trade to the ports of the United States, or returning therefrom either directly or by way of any foreign port to any of the open ports of China, or upon the produce, manufactures or merchandise imported in the same from China, or from any foreign country, than are imposed or levied on vessels of other nations which make no discrimination against the United States in tonnage dues or duties on imports, exports or coastwise trade, or than are imposed or levied on vessels and cargoes of citizens of the United States.

ART. 4. When controversies arise in the Chinese Empire between citizens of the United States and subjects of his Imperial Majesty, which need to be examined and decided by the public officers of the two nations, it is agreed between the Governments of the United States and China that such cases shall be tried by the proper official of the nationality of the defendant. The properly authorized official of the plaintiff's nationality shall be freely permitted to attend the trial, and shall be treated with the courtesy due to his position. He shall be granted all proper facilities for watching the proceedings in the interest of justice, and if he so desire he shall have the right to be present and to examine and to cross-examine witnesses. If he is dissatisfied with the proceedings he shall be permitted to protest against them in debate. The law administered will be the law of the nationality of the officer trying the case.

In faith whereof, the respective plenipotentiaries have signed and sealed the foregoing, at Peking, in English and Chinese, there being three originals of each text, of even tenor and date, the ratification of which shall be exchanged at Peking within one year from the date of its execution.

Done at Peking, this 17th day of November, in the year of our Lord 1880, Kuang Hsi sixth year, tenth moon, fifteenth day. Signed and sealed by the Commissioners.

### California to Arizona by Wagon.

We have received several letters from Californians inquiring as to the best and most direct wagon route from California to this place. As it would take us some time to answer such separate correspondent, and give a satisfactory reply, we have concluded to embody the information in an article for publication, and take Stockton, near the center of California, for the starting point. The information is correct in every particular, as we condense it from the diary of Mr. W. T. Woods, who, with his family, made the trip from Marysville last spring, an account of which appeared in these columns:

From Stockton you go to French Camp, thence to Barnsbyville, on the Stanislaus river, thence to Modesto, where you cross the Tuolumne river and continue to Ceres; then to Turlock, on the railroad; thence to Hoptown, on the Merced river, about 75 miles from Stockton; thence to Cox's ferry, and cross the Merced river, and thence to Merced City; from thence to Cottonwood creek, Berenda station, Fresno river, which you cross and continue to Borden, on the San Joaquin river, and thence to Fresno City, and from thence to Fowlers; thence to Kings river and Visalia, where you take the Farmersville road and go to Pottersville, about 200 miles from Stockton. Thence to Mandala Plana, on the Tulare river; thence to Deer creek and cross White river; where you cross a 30-mile desert to Kern valley; thence to Bakersfield and Sumner, the railroad station; thence via Tehachapi route to Caliente; thence to the old and new towns of Tehachapi, and thence to Cameron; and thence to Mohave and Buckhorn springs, and on to the Mohave river. From the Mohave river to Point of Rocks; thence to Cottonwood and Grapevine, which is about 425 miles from Stockton. From thence down the river to Fish Pond; thence to Camp Cody; thence to the Caves, on the Mohave river; thence to Soda lake; thence to Merrill springs; thence to Government Holes; thence to Pahute springs; thence up to the summit and down, passing through Lincoln county, Nevada, and to the Colorado river, opposite Fort Mohave, where you cross the river and continue up to Alexandria, via Hardyville; from thence through Union canyon to the Toll gate, which is some 625 miles from the place of starting. From thence you go to Beal springs; thence to Hualapai springs; thence to the Tanks, where you have the Prescott road, and turn down the Sandy, pass by the "Stinking wells," and on down the Sandy to Omerra ranch and the Santa Margarita; thence to Grapevine, and thence to Date creek. From this place to Wickenburg, and thence to Seymour; next to Agua Fria, and thence to Phoenix, which is about 850 miles from Stockton, and it will take from 35 to 40 days to make the trip, where you will find the editor of the *Expositor* and many others who will be glad to show you our country and tell you of its wonderful mineral wealth.—*Territorial Expositor*.

### Snow Slides in Utah.

The *Tribune's* correspondent at Alta, Utah, furnishes the following particulars of the great storm and disastrous snowslides at that place last night: The storm here to-day has been the most severe witnessed in the mountains, great sheets of snow falling, so that it was impossible to venture beyond one's door, and slides were frequent. The first occurred at 10 o'clock, and started nearly at the top of the mountain in the vicinity of the Rough and Ready mine. It came crashing down the mountain side, carrying away the flag staff, one house, 300 or 400 ft. of railroad snow sheds and telegraph poles, thence across the flat and creek and up the opposite mountains. The concussion was so great as to break open the doors and windows of houses in the vicinity. At 12 o'clock another slide broke up Davenport gulch, and passed over the Imperial and Victoria boarding house in which were two men. The house was covered to the depth of 20 ft., and the men were 10 hours digging their way out. This slide continued down the mountain, and swept the boarding house of the Grizzly mine. Here was the most awful disaster of the terrible night. In this house was Mrs. Jonathan Harkins and four children, three boys, and a girl about 12 years; also Charles Symons, Robert Howcorth and Evan Morris. Symons and the oldest boy of Mrs. Harkins were sleeping upstairs, and were thrown out of the house unhurt, but all the rest were buried in the slide. The alarm was given by the survivors, and the miners at the City of Rocks began the work of excavation, joined by miners of the Prince of Wales and others from the Alta. The work continued till 10 o'clock this (Friday) morning, when the two little boys were taken out alive, one injured in the back. Mrs. Harkins and her daughter Jennie were discovered dead, but the bodies of Howcorth and Morris still remain in the slide. Another slide occurred at the Toledo mine, carrying away a compressor and hoarding house. Charles Borbridge and Frank Laporte were in the house at the time. Their bodies were recovered this morning by a rescuing party.

There is no doubt that more lives have been lost and more property destroyed, but the above is all that is known at present.

### Gold in Alaska.

At last the gold and silver mines of Alaska are becoming more known and their value demonstrated. We have always contended that in this unknown land would be found some of the richest mineral deposits on this continent; and if half the news is true which was brought by the last steamer from Sitka, our prophecy is already more than fulfilled. It is stated that richer placer diggings have been discovered at Takou, 20 miles long by 8 wide, and that good pay-dirt is the result. No sufficient prospect has been made to speak definitely of their value, but those who are there are fully satisfied with results, and it is expected there will be a great rush there during the coming spring.

On the mainland, outside the Coast Range, between Auk and Schneck, the most extraordinary and wonderful discovery has been made of gold, silver and galena. These assays go into the thousands—one lot of ore showing \$3,000 to this ton. This gold can be seen with the naked eye, and can be felt by a blind man. A new mining district has been formed and named after Harris, the discoverer. He has taken up a town site of 160 acres of land, situated on the coast. If these stories are true, next summer will behold there one of the most flourishing mining camps on the Pacific coast. A few men are now there at work—old Alaska mountaineers, inured to the hardships and cold of that peculiar climate.

Our source of information is from the most undoubted authority. The steamer *Favorite* has gone to the new diggings with George E. Pitz, the assayer and mining engineer, whose party of prospectors are amongst the first locators of the new mines. Several of the most experienced miners who are wintering at Sitka have also gone in the *Favorite* to ascertain the truth of the report. We have, ourselves, seen some of the rock, and it is fabulously rich in appearance. Still, until further advices are received, we would caution the public against putting too much reliance in the statements made. There will be plenty of time between this and spring to ascertain the truth. The season of the year is inolement; the winter even here has set in with unusual severity, and at Takou it is rigorous, hoisterous and very cold. An unprecedented rush at this season might result in untold hardships and disasters. It is better to wait until the spring opens, when, if these marvelous stories are substantiated, we shall look for an exodus equal to the Fraser river excitement in 1857.

A number of valuable lodes of silver and argentiferous galena have also been discovered, located and secured, north of Cross Sound, and merged into a company composed of experienced and go-ahead men. Some of the rock—an average lot—has been assayed, and realizes \$180 in silver and \$40 in lead to the ton. Specimens of this ore can be seen at the office of Major Morris, special agent. Samples have also been sent to the mining magnates of Borealis building, New York. One mine of this kind only is needed to make all parties connected therewith independently rich. Major M. P. Berry, late Collector at Sitka, is President of the company. He is an old miner, and a man of great caution and experience.

We take pleasure in noticing the remarks contained in the recent report of the Secretary of the Navy, regarding the establishment of some form of civil government in Alaska, and also congratulating our neighbors on the decided stand taken by the President in his last message, wherein he recommends this to Congress, fully endorsing the report of Secretary Thompson in every particular. Once established the fact of productive mines in Alaska, and the question of population is settled. It will not be long before she will have as many white people there as there are in the State of Nevada. We shall keep our readers advised as we hear from that section.—*Puget Sound Argus*

COLLEGE OF PHARMACY.—The twelfth annual meeting of the California Pharmaceutical Society and College of Pharmacy was held at the hall of the Academy of Sciences on Thursday evening of last week. The following officers were elected to serve the ensuing year: President, Emlen Painter, Ph. G.; First Vice-President, S. A. McDonnell, Ph. G.; Second Vice-President, J. H. Dawson, Ph. G.; Corresponding and Recording Secretary, E. H. Schreck, Ph. G.; Treasurer, Wm. J. Bryan; Librarian and Curator, Ph. L. Vreeland, Ph. G.; Editor, Wm. M. Searly; Board of Directors—F. C. Keil, John Calvert, A. L. Lengfield, Wm. J. Bryan, E. A. Schreck, Emlen Painter and S. A. McDonnell. Reports were submitted by the several committees and outgoing officers. The Committee on Legislation presented a Pharmacy Act, which, with some changes, was accepted and directed to be brought before the Legislature without delay. Owing to the lateness of the hour, the reading of papers and answers to queries was postponed to an adjourned meeting, to take place one month hence.

POCKET MINES.—"Do you happen to know anything about the Flynight mine? I put a couple of thousand into it eight months ago, and I have never heard a word about it since." "Guess it was a pocket mine." "Pocket mine, what's that?" "Why, the getters up of a mine of this class put the money in their pockets, and the stockholders pocket the loss."

THE ELECTRIC LIGHT IN LONG TUNNELS.—It is proposed to light the tunnel of St. Gothard, nearly nine miles in length, by electric lamps.



## MECHANICAL PROGRESS.

## Strength in Machine Tools.

Mr. Charles T. Porter, in his paper before the American Society of Mechanical Engineers at its last meeting, offers the following valuable suggestions:

As one subject of primary importance, I wish to present that of strength in machine tools. Truth of construction, facility of operation and range of application are all, in one sense, subordinate to this fundamental quality of strength; for they are in a greater or less degree impaired where adequate strength is not provided.

But what is adequate strength? On this point there exists among the makers and users of tools a wide diversity of opinion. And on examination it will be found that this diversity coincides with the diversity in mechanical sensibility. As the mechanical sense is developed, there arises in just the same degree the demand for greater strength in machine tools.

To the mechanic who has never formed a notion of division of an inch more exact than "a bare 32d," any tool, if it can in any way be kept from chattering, is as good as another, and better if it is cheaper.

To those, on the other hand, who demand in every piece, as it comes from the tool, the closest approach to perfection, both in form and finish, a degree of strength in the tool appears, and is demonstrated, to be indispensable, that to the former class seems as absurd as the results attained by means of it appear incredible.

In this country, as indeed all over the world, the standard of mechanical truth has been very low. It is here, however, as everywhere, rapidly rising. The multitude are being educated up to the standard of the few. In this work members of this association have borne and now bear an honorable part. Just in the degree that the standard of mechanical excellence is raised must the demand become more general for greater strength in machine tools, indispensable to its attainment.

But what is the standard of strength? The anvil affords perhaps its best illustration. It is a strength enormously beyond that which prevents a tendency to chatter, a strength that under even the heaviest labor prevents the least vibration of any part of the tool, or any indication of effort, more than that the object being cut were a mass of butter.

It will be seen that this absolute solidity in machine tools, while truth cannot be attained without it, enables also mechanical operations generally to be performed with far greater expedition, and the subsequent work of the finisher to be in any case much diminished, and often dispensed with entirely.

We are enabled, in most cases, to come at once to the form desired, whatever may be the quality of material to be removed, and always to finish the surface with a degree of truth and polish otherwise unattainable, dispensing, in a great measure, with the use of that abomination, the file.

Now, with this standard in our mind, we look over the face of the land, and behold it covered with rubbish.

It is curious to observe how ingenious tool-makers have generally been in trying to avoid this quality of strength, and how deceptive an appearance in this respect many tools present.

It is interesting to note how little this quality of solidity adds to the cost of casting. The addition is merely so much more pig-iron, and really not that, because in the stove plate style the forms are more complicated, the patterns more expensive and frail, and the cost of molding is greater. But what signifies even a considerable increase in the first cost of a tool that in daily use is to perform the work of many, and is to place its possessor on a mechanical eminence?

It is not the purpose of this paper to enter into details, interesting and important as they are, but to draw attention to the subject in a general way. The improvement observed quite recently in this respect, as well as in other points of tool construction, is highly gratifying, and encourages the expectation of still further and more general progress.

## The Ship of the Future.

In attempting to replace wood with iron in the building of heavy ships many difficulties have been encountered, and resort was finally had to steel; but still the results were not what was expected. Many, even of the best plates produced, failed to pass the requisite inspection, and, in numerous cases, when they did pass, and were put into actual service in the hulls of vessels, cracked and gave out in most inexplicable ways. Seams would sometimes open up the whole length of a plate, the fracture of which showed no sufficient cause for such weakness. But still the steel manufacturers of Great Britain, though greatly discouraged, would not give it up. They called to their assistance the best scientific talent of the world to study out the problem, to determine where the difficulty existed, and to devise a way to remedy it. England's supremacy on the ocean depended upon the successful solution of the problem.

The failures were many; the experiments were tedious and costly; but success seems to have finally crowned their efforts, and we may now safely predict that the ships of the future will be constructed of steel; that they will be far more durable, much cheaper in the end, able to carry more freight in proportion to size, be safer from the ordinary danger of the seas, whether from foundering, stranding on a lee-shore, or striking upon sunken rocks, and finally that they will secure a material addition to the profits of a voyage over ships of either iron or wood. Owing to the improved processes introduced into the manufacture of iron and its conversion into steel, plates are now made which will endure a tension strength of from 26 to 30 tons per inch, and the ductility of which satisfies all the bending and punching tests which the most rigid inspector can prescribe. Ships built in English dock yards of such improved steel are already afloat, and giving the most entire satisfaction. The Cunard Co. are now building a large steamer of this improved steel. The building of steel steamships is no longer experimental. And notwithstanding less than five years ago British steel manufacturers were on the point of abandoning in despair their efforts in this direction, steel is to-day victorious, and even the British Admiralty accepts the fact.—*Californian for February.*

## Material for Boilers.

A writer in the *Paper Trade Journal* writes, in regard to the material for boilers, as follows: "Cast iron boilers are all, of necessity, of the sectional type. Their advantages over wrought iron are that cast iron is a better conductor, is more durable, resists corrosion better, being proof against the chemical action of feed water and gases, does not blister, is less easily strained by unequal temperature, requires no braces to resist high pressure, is cheap, is easily duplicated and mended parts are as strong as new. The objections are that it is treacherous at high or unequal temperatures, has hidden flaws that give no warning of weakness, they are more difficult to get uniform in strength, and boilers made of it prime and are deficient in circulation. The nearer circular the parts of a cast iron boiler so much the better."

Now, let us see what Mr. Shock says in his new work: "Its first low cost and the ease with which it can be worked give it great advantages for such purposes"—speaking of grate bars, ash pans, furnace and up-take doors, etc.—but Mr. Shock confines its use to boiler appendages: "But the uncertain strength caused by defective moulding, its brittleness and low tensile strength renders it unfit for extensive use for parts of boilers proper. Its unyielding nature unfits it especially for parts subjected to unequal expansion from differences of temperature. Several kinds of modern sectional boilers consist, however, almost entirely of small cast iron spheres or tubes."

Upon the above the editor of the *Boston Journal of Commerce* writes as follows:

The party who wrote the first paragraph had evidently never read Shock's book, and, it is more than likely, had no practical experience either in building or managing boilers. He does not say that a cast iron boiler never was built, or never can be, without a liberal use of wrought iron to hold it together, that they are always giving out somewhere, that a little misfit in workmanship is a continual annoyance, a nuisance and often a bill of expense. He does not say that the spheres are sometimes cast half an inch thick upon one side and three-sixteenths upon another, and from that down to one-sixteenth. But better than all the rest is Joseph Harrison, Jr.'s remark, when he decided to close up his cast iron boiler works, and made the announcement: "Cast iron boilers, gentlemen, are a failure; buy your boilers somewhere else"; and this after an expenditure of probably \$300,000, if not more. At the same time, people must write something for the papers, and the more they mislead the public the more valuable, in their idea, the articles are. The same writer also writes of wrought iron and mild steel boilers, condensing his mild steel boilers into six lines, stating that it is more difficult to work than iron, more apt to be brittle, etc. This man evidently has not traveled among Boston boiler makers, and we presume if he would get into the neighborhood of Cleveland, Ohio, he will find men who will laugh at him for his egotistical complacency. Homogeneous iron, or, as it is called, mild plate steel, makes, to-day, the best boiler in the world; and it must be understood first of all that the quality is only produced by some two or three concerns in the United States at the moment, and when we say best boiler in the world, we mean of steel, made by honest makers, whose determination is to get high tensile strength, as well as the full amount of ductility, both of which are regular productions, and the few mills who are making the proper quality of steel have orders entered on their books for months ahead of their full production.

A MIGHTY LEVER.—About the first of December last the mightiest lever in the world was completed for the Royal gun factories at Woolwich. Its manufacture occupied about four years. The girder radiates on a central pile, with the outer extremity of the arm supported upon a wheeled tower traveling on a circular railway, which incloses about a quarter of an acre of ground. In the construction of the machine 1,800 tons of iron and three tons of brass were used. The crane is capable of lifting four 100-ton guns at once, and was constructed with a view of dealing with specimens of ordnance of much greater weight than those mentioned.

## SCIENTIFIC PROGRESS.

## Jupiter and His Spots.

The most attractive object in the evening sky just at this time is the giant planet Jupiter. The markings upon his belts have for some time been attracting the universal attention of astronomers and amateur observers. Always enigmatical, this planet has, since the appearance of the great red spot in its southern hemisphere, become still more perplexing to the astronomer. It was at first supposed that this prominent object would form a ready means of determining the true period of the planet's revolution, but that result has not been realized. On the contrary, if anything, it has rendered that problem still more doubtful.

Soon after the "great" spot was discovered, two or three other smaller, but still plainly discernible and permanent spots were observed near by the large one. Close and continued observations of these several spots during the past summer, according to the published reports of Prof. Barnard, of Nashville, Tennessee, have revealed the most singular fact yet developed, that these spots are not identical in their revolutions, as would be the case if they were absolutely fixed to the central nucleus of the planet. On the 25th of last July, the center of one of the small spots preceded the center of the large spot by one hour and 35 minutes. On the 22d of November the center of the small spot preceded the center of the large one by three hours and 17 minutes. The large spot had thus apparently moved backward one hour and 42 minutes between July 25th and November 22d, showing a daily difference of rotation of 0.439 minutes per day. At this rate the small spot would gain an entire revolution in about 23 months. There is quite a difference in the motion of all the spots to be seen on the planet's disk.

In a letter to *Science*, dated November 29th, Prof. Barnard writes in regard to this planet as follows: "The region occupied by the equatorial belt is subject to constant and quite rapid change, being filled at times with the most delicate soft, plummy forms. Brilliant white spots are not infrequent in this zone. . . . All the objects in the equatorial zone move with a very great velocity in the direction of rotation, but invariably in a contrary direction to that pursued by the (great) red spot, which is really the only object on the planet which has a backward motion. Indeed, it would not be a bad comparison to compare the red spot to a mighty city built on the shore of a vast and swiftly flowing river, which is constantly being filled with drift, and an occasional glistening mass of ice tearing its way past the city with a velocity of not less than 6,000 miles a day. In such a comparison the city would be as great an area as three-fourths of our entire earth, and the river fully 16,000 miles in breadth."

Jupiter passed its perihelion on the 25th of September last. That great planet then reached its nearest point to the sun, and was also, at the same time, within a few days of its nearest point to the earth; so that the rhinoceros of its perihelion and its nearest approach to the earth and sun has already passed. At its perihelion, Jupiter is 46,000,000 miles nearer the sun than at its aphelion. The difference between the two intervals of distance is about half the entire average distance of the earth from the sun. Yet Jupiter, at its nearest approach, is 450,000,000 miles from the great central luminary. Nearly 12 years must elapse before Jupiter will be as favorably situated for observation as he is at this time.

With the exception of Saturn, nothing in the heavens affords a more interesting subject for study than Jupiter and his moons. It is delightful to watch those four little diamond-points as they move in rapid succession around the parent body, passing now as dark spots across his disk, then behind and eclipsed by it. A glimpse of its moons may be had even through a good opera-glass, and in an exceptionally clear atmosphere, at a considerable elevation above the sea, they have been seen by the unaided eye. The large spot may be seen with a five-inch telescope. When this spot is just beginning to appear at the eastern portion of Jupiter's disk, so rapid is the rotation of that planet that in a little over two hours it will have reached the center, and in less than five it will again be out of sight, having passed around its western limb. The size of this spot varies somewhat in length, but is quite constant in breadth. Its average length is about 23,000 miles, by a breadth, in its widest portion, of 6,900 miles—equal in area to about three-quarters of the entire surface of the earth. Its color is a light red. Jupiter turns on its axis in a little less than 10 hours, so that an observer on its equator would be hurled around at a rate of 500 miles a minute instead of the comparatively slow progress of 17 miles that marks the rate of the earth's revolution at its equator.—*Californian for February.*

ANOTHER COMET.—The Smithsonian Institution has received from the Astronomer Royal, of England, the announcement of the discovery by Cooper, on December 21st, at nine o'clock, P. M., Greenwich mean time, of a bright comet in 1 hour 5 minutes right ascension and 6° north declination, which, at seven o'clock, December 25th, was in 1 hour 29 minutes right ascension and 2° north declination.

## The Coloring Matter of Flowers.

Hitherto it has generally been supposed that the various colors observable in flowers and leaves were due to different kinds of matter which enter into the composition of the leaves and petals—each color being a different chemical combination, and so constituted that the substance of no one color could in any natural way be made to take up another color. Recently, however, Prof. Schuetzler read an interesting paper upon this subject before the Vadois Society of Natural Sciences, in which that gentleman details a series of experiments recently made by him, which present this interesting subject in an entirely new light. The professor showed by experiment that when the color of a flower has been extracted by macerating the flower in alcohol, one may, by adding different acids or alkalis, obtain from that one color all the various other colors which plants exhibit. Take, for example, a peony: when macerated in alcohol, a violet-red liquid is obtained. Now, if some oxalate of potassa be added to the fluid, it becomes pure red; if soda be added, it will appear violet, blue or green, according to the proportion of soda employed. If a green color is produced, it will appear red by transmitted light, just as a solution of chlorophyll does.

It was held by the professor that these changes of color might quite as well be obtained naturally in the plant by giving it the proper plant nourishment, since in all plants acid or alkaline matters always exist. It was furthermore stated that the change from green to red in "autumn leaves" is due to the action of the tannin, which is developed in the leaves. Hence, without affirming it absolutely, the professor believes that there is in plants and flowers only one coloring matter—chlorophyll—which, being modified by certain agents, furnishes all the various tints that flowers and leaves exhibit. As for white flowers, said the professor, it is well known that their cells are filled with a colorless fluid, opacity being due to the air contained in their numerous cells. This may be proved by placing the petals of such flowers under the receiver of an air-pump, when they are seen to lose their opacity, and become transparent as the air escapes. If the deduction which the professor makes from his experiments are correct, a wide and most interesting field of experiment is hereby opened up to the scientific florist.—*Californian for February.*

## A Scientific Application of the Photophone.

Prof. Bell's newly invented instrument for the reproduction of sound through the agency of a beam of light, is being applied to the study of this solar surface. While Mr. Bell was in Paris, recently, M. Janssen, having informed him that he had detected movements of prodigious rapidity in the photospheric matter, Mr. Bell suggested the idea of employing his photophone for the reproduction, at the earth's surface, of the sounds which must necessarily accompany such movements. M. Janssen approved the idea, and requested Mr. Bell to attempt its realization at the Mendon Observatory, where all necessary instruments and facilities would be placed at his disposal. The first attempt was made on the 30th of October, but the phenomena were not sufficiently decided to be regarded as successful; yet Mr. Bell hopes to succeed by continued study and perseverance. Experiments will, therefore, be continued. M. Janssen holds that the idea is one of so much importance that its author, Mr. Bell, should be fully recognized in his priority of its conception.

## The Sun Recording Its Own Brilliancy.

An instrument for recording the intensity and duration of sunshine was devised as early as 1856, by Mr. J. F. Campbell, of England; but it has never, until quite recently, been made thoroughly practical and reliable. Still, even in its imperfect form, it has been made to do duty for several years at Greenwich and Kew, and several private observatories in England. The instrument consists of an ordinary "burning-glass," or lens, the focus of which is made to keep its place on a constantly moving strip of paper. The manifest difficulty of properly adjusting the complicated movements involved in such a work has only quite recently been fully overcome by the genius and patience of Prof. Stokes of England, whose improved instrument has recently been set up in some 30 stations in the British Isles. We are not advised as to whether the instrument has been introduced into this country; but if it will do what it is credited with, it must soon become a part of the ordinary equipment of every meteorological station in the world; for by it we may, in time, obtain a sufficient record of a meteorological element of primary importance in its relation to agriculture and to the public health, but which has heretofore been very imperfectly registered.

CALORIFIC VALUE OF HYDROGEN.—From a given weight of hydrogen gas under combustion a greater quantity of heat can be generated than from an equal weight of any other known combustible. A pound of pure carbon will evaporate 12½ lbs. of water and convert it into steam of 15 lbs. pressure on the square inch. One lb. of good Pennsylvania anthracite is capable of raising nine and one-half lbs. of water at 211° F. into steam.



The Porter mine has been dismantled - the 12 stamp mill



and the engine having been moved over to the Meredith mine last week. Mr. Denner will add 4 more stamps to the mill.

We notice in the New York Sun, of Jan. 1st, that Prof. Edison and his head chemist, Prof. Heid, are making preparations to start for this city to meet Major McLaughlin, his mining engineer.

This mining mine is all ready to commence work. Their mill, a Folsom pulverizer, has been set up, and all the owners are waiting for it is the agent of the mill to come up and inspect it before they start up.

In the Oronine they are still running the tunnel. It has been driven in 710 ft through solid granite, and in running that distance have cut through 4 fine ledges. In a short time they will prospect them.

They are waiting on the *Roy Stone*, but for Mathematics to bring up a new casing from Sacramento. The old casing is not satisfactory to himself, and he wishes to use some changes in it before making a trial.

The Treadwell mine, 2 1/2 miles above Lovelock, is developing very rich ore. Although the vein is quite small, they have got out over 12 tons of quartz. The mine was bonded, last year, to a San Francisco company, who have lately renewed the bond.

**CALAVERAS.**

**EUREKA HYDRAULIC.**—Calaveras Chronicle, Jan. 15: Work has been prosecuted without interruption for some time in this claim, in fact ever since sufficient water was obtainable. There is no let up to the work. The 2 hydraulic pipes are firing right at the immense bank day after day. Within the last 3 or 4 weeks a circular excavation has been made in the hill over 200 ft in diameter, the bank being at least 100 ft in height. To supply the claim with water there is about 9,000 ft of pipe used, leading from 2 large ditches. The gravel runs off very rapidly through the 1,500 ft of flume which dumps the tailings into the Calaveras river. Everything is in first-rate working order, and with the present prospect of an abundance of water during the season, under the experienced management of the Cook Bros., proprietors, the Eureka will make a good report.

**EL DORADO.**

**FISHBURN.**—Mountain Democrat, Jan. 15: The Cal. W. & M. Co. has completed the laying of the 3,500 ft of 15-inch main pipe, and the water has been running since it was turned on during the past week. Its working gives the utmost satisfaction. The pipe delivers 220 inches, with a loss of less than 2 inches from leakage. With an assurance of a constant supply of water, the North Star, Bower and Munz mines, owned by Eastern capitalists, will now be energetically worked. The Greenwood seam held promises, at no distant day, to be one of the most prosperous mining camps in the State.

We were over to Will Collins' team diggers, the other day, and, judging from the small amount of work which has been done and the amount of gold taken out, he has a good paying mine.

A. J. WILSON, who came down from Kentucky flat, up to the Middle Fork of the American, on Thursday, informs us that a land slide took place at Oliver's mine, on Big bar, the other day, which carried with it the boarding-house, tools, etc., into the river. Mr. Wilson brought down specimens of mineral land productions from his mining claim, which excel anything we have seen for some time.

**INYO.**

**SALE OF ORE.**—Inyo Independent, Jan. 15: The ore now on the dump of the Ygnacio mine at Cerro Gordo has been sold to the Owens Lake mill and mining company, and the work of sacking and hauling the ore to the new mill at Keeler City will commence in a few days. We presume the mill will start up in a short time and make its first run on Ygnacio ore.

**A NEW DISCOVERY.**—On the east side of Mazurka canyon, and directly opposite Independence, there is an immense ledge cropping out. This ledge is in plain sight from town, and has been traveled over by prospectors since the first discovery. The ledge lies between limestone and granite, and crops out for a distance of 3 miles, showing dark red matter colored by iron oxide. Messrs. Woodhull & Phillips, having long been satisfied that this was the croppings of argenteous lead ores, lately made a careful examination of the ground, and they have been rewarded by finding the existence of large ore bodies near the surface. A number of samples have been assayed, showing ore carrying silver from \$25 to \$31, and gold from \$3 to \$8 per ton. The average of 42 lead assays was also found. Six claims have been located. But little prospecting has been done; however, enough is shown to prove that there is inexhaustible quantities of smelting ore under the croppings of this big ledge.

**MARIPOSA.**

**OPENING AN OLD MINE.**—Mariposa Gazette, Jan. 15: George Chittenden, owner of the old Grimsaw quartz mine, lying contiguous to the stage and wagon road, about 4 miles north of Hornitos, has commenced sinking a shaft and opening up this mine, which has lain dormant for a number of years. Considerable prospecting was done formerly upon the outcroppings of the vein, from which was taken a large amount of rich rock and ground in arrastras; at which time the mine was considered very valuable and held at a very high figure. The chances are favorable to this mine as being one of the best in the Hornitos district.

**NEVADA.**

**FOUND THE CHANNEL.**—Nevada Transcript, Jan. 15: Some very encouraging developments have been made during the past few days at the True Blue claim, owned by Messrs. Wellington, Robinson & Stevens, and situated about 4 miles north of this city. The incline has been opened into blue gravel, indicating the presence of the dead river channel for which the company have so long been engaged in running and sinking. Water is coming in rapidly, and Messrs. Robinson & Wellington went up to the property yesterday to decide on what steps they should take in the way of providing for future operations. It is believed the erection of machinery will be found necessary.

**OPENING A NEW MINE.**—Nevada Transcript, Jan. 15: D. T. Hughes arrived from the hay Sunday evening, and yesterday morning he went to Blue Tent to begin the development of his hydraulic claim there, formerly known as the Shellenberger ground. The property is generally conceded to be a first-class one.

**CROSBY WORKS.**—Nevada Herald, Jan. 18: The Crosby sulphur works are running in full blast day and night. A large amount of sulphur from the Merrifield mine are being daily hauled there.

For several days past work has progressed smoothly at the Manzanita hydraulic diggings. No accident has occurred to interfere with the working of the mine.

**PLACER MINES.**—In this vicinity are running in full blast. Work at the Nevada City mine is progressing favorably. During the past few days workmen have been engaged in repairing the rock house.

**PLUMAS.**

**SOUTHERN EUREKA COX.**—Greenville Bulletin, Jan. 15: Everything is progressing steadily. Most of the machinery in the new mill is in place and the tramway nearly completed.

**INDIAN VALLEY.**—A day or two more will complete the new mill and the arrangement of the engine and machinery. In our next, we hope to give something of a description of the mine and its workings.

**OLD STRIKE.**—At this mine work is progressing as usual, the 24-stamp mill running constantly on good rock. There is continued improvement in the Kerr tunnel, indicating near approach to pay ore, also fine indications in the Mullen drift.

**CROSBY.**—Good sleighing has favored the hauling of ore to the mill of this company, so that it has been kept running with little interruption. The hauling works are fairly in running order and the Oarfield shaft is being rapidly put down to more thoroughly develop what is known to be rich country, as was shown by the former lower workings on this property.

**BLACK HAWK.**—Near the head waters of Black Hawk creek, not far from Butterly valley, Brown, Christenot &

Co. are putting in an 8-stamp mill, complete with concentrators, formerly known as the Stratton mill. It will be run by steam power, though water power can be used. They have a good ledge, and, in preparing the foundation for their mill, struck another rich ledge. The location is some 17 miles from here, and only a mile to the right of the road leading from here to Quincy.

**GREEN MOUNTAIN.**—During the past week there has been no cessation of work at either mill of this company, and they have been running constantly. The water has been going through the new pipe for upwards of 10 days, and has proved it to be substantial and well adapted to the use for which it is intended. The ditch now supplies an abundance of water for the use of both mills. The mine is rapidly getting in shape to supply the mills with less labor in the hauling of the ore, and by a general finishing up of the construction work of last season, the company expects to materially reduce the large and expensive force they have thus far had to employ. Development is in the face of the No. 5 tunnel continuing very encouraging, and the outlook is for a successful winter's work.

**AMERICAN VALLEY M. Co.**—Plumas National, Jan. 15: The machinery for this new mining operation, on the O'Neill ranch, is now running, and the shaft is down some 15 or 20 ft. Everything works nicely, and bedrock will be reached in 2 or 3 weeks. It is expected that pay gravel will soon be found after the shaft is down. It will probably be from 70 to 90 ft to bedrock.

**SIERRA.**

**ENCOURAGING.**—Mountain Messenger, Jan. 15: Blane Oravel M. Co., Sierra City, is now in with their tunnel 225 ft, running for bedrock. A second contract of 200 ft in rapid progress, and looking for bedrock in the face of the prospect well in gold and black sand. The last contract price was \$4 a ft, while the present is 75 cents less.

**PUEBLO.**—We were shown a rich quartz specimen by Jas. Beard last week, while at Sierra City, 2 1/2 lbs in weight, all sparkling with gold valued at \$8, extracted from the famed Phoenix ledge, believed by its owners to contain a bonanza of wealth.

**NORTH FORK.**—The North Fork claim, at Forest City, is being handsomely worked, and we understand, is paying handsomely. A tract of new ground has been opened. They are working a fair force of men and the prospects of the mine seem better than for many years.

**SIERRA CITY.**—Since the close of the holiday season times have not been over brisk, and all are now anxious concerning the mining prospects for the new year. The encouraging news of gravel being struck in the Bald Mountain extension tunnel, an ample and convincing proof that a channel courses up the ridge from Forest City to Gold Lake, is most cheering for eastern as well as for southern Sierra; and the stockholders of the Savage, Blue Gravel and numerous other companies on the supposed pay lead await with feverish impatience the outcome, and but a short time more will tell the story.

**CONTRACT LET.**—The Wilbourn Co. Co.'s gravel mine is located about 3 miles north of the South Fork, at Bassett's, leading toward Gold Lake. A contract has just been let to Wm. Wilbourn, a heavy stockholder, for \$90 a ft. This company owns 600 acres of ground. Further progress in the shaft was obstructed by large boulders during the recent severe storms, when snow fell to the depth of 8 ft; and as there was no blasting material nearer than Sierra City, a distance of 10 miles, work was necessarily discouraged and the boys were obliged to return homeward on snow-shoes. At the time sinking closed the shaft was in blue quartz gravel, a *face simile* of that in the Bald Mountain and Extension claims at Forest City. The prospect is very encouraging, and the tunnel will be in 100 ft beyond the shaft by the 1st of September.

**TUOLUMNE.**

**SONORA.**—Tuolumne Independent, Jan. 15: The Sonora mine is situated just inside of the town limits, and carries a very fine lode averaging 3 in. in size, and in vertical, contains enough for sinking to warrant it yielding \$10 to \$15 per ton. But the main valuable feature of this mine is the exceedingly rich sulphurets, which assay from \$500 to \$1,000 per ton, of which at present we should judge there are about 5%, and steadily increasing in quantity as they go down, with the same high grade. The shaft, No. 1, from which these sulphurets are being taken, is on the south end of the mine, is now sunk about 30 ft. Two shifts of miners are at work in the 24 hours. There is no water to prevent easy sinking; there are about 25 to 30 tons of ore on the dump. One rather peculiar feature of this mine is that the country rock on the foot wall proper of the vein, carries small seams or feeders that run into the vein at right angles, showing, when closely observed, free gold. The whole mine is intersected with cross-courses and feed-veins. Also the celebrated Divoll honanza vein crosses the Sonora vein at an obtuse angle, at about 200 ft from No. 1 shaft. The flattering record of a new claim is always recognized among the most pleasing items in a mining company. About one-half mile east from Groveland Messrs. Richards & Hunter have a claim that is paying well and are getting out rich hand-mortal rock. The rock pays from \$5 to \$70 per lb, which is taken from a small streak on the footwall side of the main vein, which is from 6 inches to 2 1/2 ft wide. The chute is 120 ft long, and they have taken out \$5,000 on one end and about the same amount on the other end. This is about the richest small vein, except the "Keith," below Jacksonville, in that part of the country.

A tin wash-up is expected at the Rough & Ready gravel mine, in Table mountain, after the present run. The company are going to work systematically by driving a series of cuts into the gravel. John Pereira, who owns a large tract on the channel line adjoining this claim, will shortly make preparations for opening the same. On the whole, the prospect for this mining in Table mountain is again coming to the front. From 5 to 10 and 12 the per day to the claim was frequently taken out, with an aggregate of 60 and 70 lbs per day, in the days of '55 and '56. There are miles of virgin channel extending from Shaw's flat to Knight's Ferry, untouched.

The mill on the Evans mine has started up and are now working a fine quality of ore. Owing to the extreme cold weather in that section it is almost impossible to save the fine particles of gold.

**NEVADA.**

**WASHOE DISTRICT.**

**SIERRA NEVADA.**—Enterprise, Jan. 16: During the past week the upraise from the 2500 level has been extended 20 ft; total height, 460 ft. The drift west to the 4th floor of the 2500 level from here has been extended 33 ft. Amount of ore raised during the week, 25 tons.

**UNION CON.**—On the 2500 level the joint Mexican upraise has been connected with the 2300 level; the joint Mexican west crosscut extended 22 ft. Drill hole No. 6 from No. 1 winze extended 200 ft; assays from a trace to \$10. During the week 33 tons of ore have been extracted from the 2500 level.

**CALIFORNIA.**—During the past week 800 tons of ore have been extracted and sent to the mills; average assay, \$13.95. On the 2300 level, in the joint Ophir east crosscut, are cutting out for a winze. The joint Con. Virginia east crosscut has been advanced 22 ft.

**MEXICAN.**—On the 2500 level the joint Ophir east winze has been sunk and timbered 12 ft, and a tank-pit is being cut out at the 2600 station; the west crosscut has been extended 20 ft.

**ORE.**—On the 2500 level the joint Mexican winze has been sunk 12 ft, and a tank station is being cut out at the 2600 level. On the 2300 level in the joint east crosscut are cutting out for a winze.

**CON. VIRGINIA.**—During the past week 747 tons of ore have been extracted; assay value, \$13.72. On the 2300 level the south drift has been extended 24 ft and the joint California east crosscut has been advanced 22 ft. During the week \$56,794.39 in bullion have been shipped.

**HALE & NORCROSS.**—The ruins of our hoisting works are being cleared away to make place for the building formerly used as the Con. Virginia hoisting works. The north lateral drift, 2400 level, has been extended 44 ft up to the time of the fire.

**UNION SHAFT.**—Shaft sunk and timbered 7 ft; repairing

drift at 1600 level, cutting out bob-pit at the 2200 and easing timber at the 2300 and 2400 stations.

**UTAH.**—During the past week the east drift on the 1350 level has been advanced 13 ft. On the 2150 level the east drift has been extended 23 ft.

**C. & S. SHAFT.**—The pump is being placed in position at the 2400 station.

**YELLOW JACKET.**—During the past week we have advanced the drift on the Sutor tunnel level 56 ft, making the present length of the same 104 ft from the switch. The ground has been quite hard and dry. The drift is 8 1/2 ft in size. The water in the shaft has risen on the 2300 level so as to cut off the air connection with the old workings.

**SILVER HILL.**—The winze has been sunk and timbered 12 ft; it has been very hard and short up to yesterday morning, since then softer and better working. In the bottom there are several streaks of fine quartz carrying metal and looking well. Work on the 300 level will be finished and ready for the water to-morrow.

**BRISTOL DISTRICT.**

**SHUT DOWN.**—Ward Reflex, Jan. 15: Jo. Lang, who has been stoping in Bristol for some time past, but returned to Ward a few days ago, confirms the report that everything has been shut down at Bristol. He is of the opinion that work will be resumed in 10 or 15 days.

**CHERRY CREEK DISTRICT.**

**NO WORK.**—Ward Reflex, Jan. 15: A letter has been received here from Cherry Creek, in which the writer says that but one of the miners who left here some time ago has found employment. The rest got there last week, but are too late. The streets are at times black with idle men. Those employed in the Star work in water up to their waste most of the time.

**EUREKA DISTRICT.**

**BULLWHACKER.**—Sentinel, Jan. 15: We went down, down—one step at a time—until the 75 level was reached. Here two men were stoping out ore from an upraise. Very little blasting was being done and still, within 48 hours, they had knocked down 10 or 12 tons of ore which would run from 40% to 60% lead and about 20 ounces in silver. Although the shaft was in a terrible condition when the recent work of repairing it was begun; it is now in splendid order for the work required. Upon the 130 level an immense amount of sulphurets has been found, and the large chambers of ore have been stoped out in the days when lead was of value, much of the same assaying as high as 75%. In 1873 the shaft was continued below these chambers about 100 ft, but careless and reckless workers after the riches of the 130 level have filled it up to that level with debris and waste rock. From one drift on this level a large body of ore has been followed to the north and downward until it is almost impossible to extract the same profitably. As a consequence, Mr. Kermann has ordered the old shaft cleaned out, and from the bottom will drift and stope up towards the known body. The working out of the waste and debris is well under way, 2 men being constantly employed thereat. When some 15 or 20 tons of ore are stoped down on the 75 level, it is at once hoisted and shipped to the Atlas furnace. The tracks from the shaft and to the waste and ore dumps are in good condition for rapid work. The ore wagons can be loaded from a platform, and the roads therefrom are of easy grade. It is the intention of the company to do some heavy work in the old Bullwhacker mine as soon as the shaft is cleaned out and the track in running order to the bottom thereof.

**GRANTSVILLE DISTRICT.**

**THE CENTRAL MINE.**—Bonanza, Jan. 15: Work in this mine is progressing steadily and with very encouraging results. The ore continues to improve in extent and richness as depth is attained. During the coming summer this mine will undoubtedly be added to the list of bullion producers.

**THE LIDA MINE.**—Among other mines of this place which show and go to prove this one of the largest mineral belts in the State, is the Lida mine, which, from its proximity to the Alexander, leads us to believe that it is situated on the same ledge or lode. This mine, in every place that has been opened, shows ore of the same character that is found in the upper levels of the Alexander. Developments are steadily progressing.

**ALEXANDER.**—The stopes in the Alexander have improved very much. Have connected the west stope in No. 5 with the 4th level, in which place nothing is to be seen but one mass of sulphurets ore. This stope is now wonderful, showing over 100 ft in length and an immense width, if we can judge from crosscuts in these two levels. East stope in No. 5 and No. 6 levels are looking better than ever.

**THE BROOKLYN.**—The Brooklyn, in lower level, is developing a large body of rich ore. An idea of its extent and value can be gained from the fact that simply in opening the level 20 stamps are continuously supplied with rock for crushing.

**THE ALEXANDER MILL.**—The mill is doing splendid work, and everything is running to my entire satisfaction.

**MOUNT ROSE DISTRICT.**

**AT WORK.**—Silver State, Jan. 12: The Wild Goose company, whose mine is located in Mount Rose district, is going to work energetically. They have let a contract to sink the shaft, which was started some time ago, in the ledge. The mine is situated near the Bullion, of Paradise, and the owners say that the Bullion drift is now at the Wild Goose line. The shaft, which is now being sunk, is expected to reach the ledge within 50 ft, and when it does so the company will commence extracting ore.

**SILVER CANYON DISTRICT.**

**RUNNING.**—Ward Reflex, Jan. 8: John L. Robertson, engineer of the mill at Silver Canyon, came over Wednesday on a flying visit. He reports the mill at that place running smoothly and giving entire satisfaction. As an evidence of the richness of the ore, he says 5 casks were hung up for a short time and the bottom of the mortar was found to be covered with a sheet of silver that is liable to get thicker before they have a clean-up. This is well calculated to remind an old White Piner of the time when it was necessary to mix barren rock with Eberhardt ore in order to work it. Mr. Robertson thinks they will have some bullion out before he gets back.

**WARD DISTRICT.**

**MARTIN WHITE TUNNEL.**—Ward Reflex, Jan. 15: On a visit recently we all agreed that the tunnel had been run in the right direction, and not too far north, as many contended. The tunnel cuts the porphyry formation in which the ore bodies were found above and runs about parallel with it. Crosscuts demonstrate the fact that the formation is pitching northeast. In the upper workings it pitches southwest. A crosscut 2,600 ft from the mouth has been run 300 ft southwest, and has cut through the porphyry in that direction. In another, 2,100 ft from the mouth, running northeast, a vein of ore 1 ft wide has been encountered a short distance from the tunnel, some of which assays as high as \$100 to the ton. The 2000-ft crosscut has run through 20 ft of barren quartz and was getting fairly into porphyry at the time of our visit. Several other cuts have been run which go to show the ore to be in the fine mine, and the hanging wall. The ore found a few feet from the tunnel on the north side encourages this belief.

The Paymaster, so far, greatly resembles the Comstock, and if large bodies of ore are found in the lower workings it will be equally as permanent.

**WHITE PINE DISTRICT.**

**RESUMED.**—Cor. Eureka Ledger, Jan. 15: The Eberhardt & Aurora Co. has resumed and purpose to push the tunnel ahead vigorously, and will shortly begin crosscutting and prospecting in good shape. The snow on the Treasure hill is 10 ft deep and there is no passage for teams. The once famous Treasure hill has lost to show the vestige of its former metropolitan prominence and gasped its last with the old year when its 87 postoffice was discontinued. There is one mine working on White Pine mountain, the Trench.

**ARIZONA.**

**GLOR NEWS.**—Silver Belt, Jan. 8: We hear encouraging reports from the Centennial. We also learn that dur-

ing the coming week the superintendent will send in the Globe mill from 75 to 100 tons of ore, which will probably mill as high as \$200 per ton. Two shifts are running on the California, and ore is being hauled to the Champion mill. It is claimed by those who ought to know, that the ore will yield not less than \$225 per ton. Mr. Wilder, at a depth of 150 ft, is drifting southeast for the Telfair ledge. The indications are that he will strike it in about 20 ft. Under Joe Caldwell was in Globe from the East Verde the present week, bringing with him gold retort, worth \$17 per oz, which aggregated upwards of \$400. This he obtained by assaying—the result of 11 days run. A strike is reported in the Fannie J. of 2 1/2 ft of ore which assays from 88 to 275 ozs. Present showing indicates permanence. Globe district mines are improving as depth is attained. We do not know of a single lode that showed mineral in the croppings that has petered out.

W. B. Helms has contracted to extract, haul and work at the Isabella mill 100 tons Chrome ore. Gen. McDonnell is about erecting a furnace for the smelting of copper ore from the Buffalo mine. George Scott is now taking some very fine copper ore out of the Interloper mine. Yesterday he took out some 5 tons. It is contemplated to smelt the Interloper ore in the McDonnell furnace.

**TURKEY CREEK.**—Miner, Jan. 14: Mr. Jas. Mes, one of our foremost mining men, arrived here last year from Tucson, in Turkey Creek district. He is enroute to San Francisco, and will there procure a 5-stamp mill for the mine, which is now in condition to furnish ore for a much larger mill. It is opened by a shaft 100 ft in depth, also by a 300-ft tunnel. The body of pay ore measures 3 1/2 ft, samples of which have yielded at the rate of \$120 per ton. Being in the midst of a forest of oak, pine and juniper, fuel for the mill and timbers for the mine will cost but a trifle; water, too, is abundant. Samuel Dennis, just in from the Model mine, close in Peeples' valley, says that its owners, Geo. Powers & Co., have fine prospects ahead of them. The company have 20 men at work, 100 tons of ore out and a 2-stamp mill ready to run. Those of our citizens who keep posted on mining matters believe that the large veins recently discovered in Date Creek district are among the best found in the Territory. Good miners and prospectors from the other districts are now in Date Creek district, watching for the main chance.

**PROSPECT DISTRICT.**—Final Drill, Jan. 15: At the Oem mine the work of preparation for the mill is going on. They are grading opposite the tunnel on Queen creek. They have ore enough provided to keep a 5-stamp mill going constantly, and expect to increase to 10 stamps shortly; but as the company has marked its progress hitherto by caution, they are also cautious in erecting machinery, which might prove unsuitable upon a further change of the mine, as the character of the ore may change on further depth.

**EMMA.**—The Emma, in Happy camp, shows promising ore. They are at a depth of 60 ft, the ledge is 52 ft wide on top, and the vein is 15 ft wide in the shaft; good walls.

**TWO BROTHERS.**—The Arizona and Massachusetts Co. have let a new contract for sinking the main shaft 30 ft deeper, and Mr. Nettle is progressing with the work.

**WINDSOR.**—The Windsor shaft is down 30 ft and they are working on a mass of ore, gold rock, looks like California rock, value, \$100 per ton.

**SURPRISE.**—They have struck the ledge in the tunnel and it prospects well at a depth of 230 ft.

**IN SUCCESSFUL OPERATION.**—Arizona Citizen, Jan. 15: W. S. Mahry, who has just arrived from La Noria, reports that the Holland smelter is working most successfully. He was shown through the works, and was surprised at the amount of bullion already produced. Nearly 100 bars (about 5 and 6 tons) having been run out since the smelter recommenced operations, scarcely 3 days before. No difficulty whatever is experienced in working the ore, and the production of bullion, it will be seen, is about 2 1/2 tons daily. This is a very important success.

**MISTERS DISTRICT.**—M. F. Campbell, one of the owners of the Red Buck claim, in Meyers, is in town. He reports everybody busy in the district, in which some important transactions have recently taken place, which will without doubt bring this fine mineral section to the front hereafter long.

**RICH SMELTING ORE.**—Col. Sykes, Tuesday, had some rock assayed in this city which he took from the Veta claim, belonging to Jas. Knight and W. S. Fritz, and lying alongside of the west extension of the San Xavier and the Arizona Queen mines. One of the assays gave the flattering result of 23% copper, 10% lead and \$53.42 silver, while another of the assays gave 23% lead and \$100.50 in silver per ton. The vein is 3 ft wide.

**SALE OF THE YELLOW JACKET.**—On Thursday was negotiated a sale which must have a most important place in the records of the Territory. A company, headed by F. A. Tritle, Bob Morrow, Mr. Head and others, bought the Yellow Jacket property at Oro Blanco, one of the most promising gold mines in the Territory. It is the intention to have a 100-stamp mill running by July 1st of next year. The same man also purchased a few days ago, through the assistance of Col. J. R. James, of this city, the Grand Central extension at Tombstone, as well as other Tombstone property. No better evidence of the future of Arizona could be wished than the fact of the investment by such men.

**COLORADO.**

**LEADVILLE.**—Courier, Jan. 12: This camp may be said in one sense to be wallowing. The number of pay mines has been falling within a year, but the number of competent mine managers has not increased. One-half the mines are being managed by men who hardly know porphyry from quartzite. Nine-tenths of the mines have not been examined for 6 months by a disinterested expert. The owners really know nothing about them. They conduct their business as if it was faro-bank gambling, and then they complain when they lose. Every one who owns a substantial interest in a mine should have it examined, by some one who can trust who is not connected with the management, at least once every 3 months.

**NEW MEXICO.**

**SANTA RITA COPPER.**—Herald and Southwest, Jan. 14: The Romero produces native copper in sheets from 1.16 to 2 inches in thickness. The Carrasco, native copper in nuggets and nigger-heads weighing from 1 to 2,500 lbs. The Guadalupe, red oxide and copper glance. The Lea, azure and black copper glance. Pierson No. 1, iron ore, carrying 20% to 25% carbonate of copper, which makes for the native ore. Pierson No. 2, blue carbonate, flat vein, 2 to 6 ft thick, with 300 to 400 tons of ore exposed. Pierson No. 3, vertical 30-inch fissure vein, azurite. Santa Rita No. 31, vertical 30-inch fissure vein, hard blue copper. Crystal Mesa, on the same property, produces herby crystals, white garnets and fine opals. Jasper Mountain, red and yellow jasper. Pierson Mountain, fine transparent quartz crystals. All crystals, from a star down to a sheet of cast. The Santa Ritas are the Calumet and Hecla of New Mexico.

**MONTANA.**

**ANOTHER STRIKE.**—Butte Miner, Jan. 12: Adam Faraday is to be congratulated on the rich developments in the Morning Star. From the bottom of the shaft, which is 90 ft deep, drifts have been extended east and west in a total length of 360 ft. In the face of each the ore body is between 3 and 4 ft wide, the walls are regular and well defined. The lowest assay made during the past 3 weeks showed the ore, which is a base, to carry 142 ounces in silver. The highest assay was \$342. The average value of the ore is perhaps \$200. About 35 tons of first-class ore are on the dump.

**ALTA MONTANA.**—Helena Independent, Jan. 13: The Alta Montana company have more than realized our hopes as concerning the character and quality of ore that can be extracted from the Alta mine. For the first 23 days of extraction from the Alta, in their ore averages, in the works, over 100 ounces per ton, and the lead percentage is high enough for smelting purposes. The improvement in the Comet mine is most gratifying, and will supplement the output of the Alta with a very rich and desirable product. The cupel furnace, which at one time was thought to be necessary adjunct of the company's works, will not be needed, for some months at least, owing to the better quality of ore now found. Improvement and progress at mines and works are more than ever apparent.



## Mining Debris.

## The Governor's Special Message on the Subject.

Gov. Perkins has sent to the Legislature a special message on the debris question, of which we make the following abstract:

To the Senate and Assembly of the State of California:—In my annual message to your honorable bodies, I stated my intention to treat the subject of drainage in a special communication. The magnitude of the interests at stake, and the complexity of the considerations involved, render it impossible to deal curtly with the topic. When, as here, the very existence of one of the most fertile portions of the State is imperiled; when a destruction of property aggregating immense amounts is threatened; when it is made apparent that a failure to legislate effectively must entail the complete abolition of the State's most important waterways, thus retarding progress and settlement over wide areas through the consequent increase of transportation charges; when, also, there is involved the fate of an extensive productive interest, which adds yearly between \$10,000,000 and \$15,000,000 to the capital of the community; it has seemed to me that it would be a reproach on my administration did I not, to the best of my ability, express my opinion of the gravity and urgency of the situation, and give my reasons for believing it the duty of your honorable bodies to take the whole question under earnest deliberation.

## The Act to Promote Drainage.

Which was passed by your predecessors in office, received my signature in April, 1880. It is already known to your honorable bodies that considerable injury has been done to farming lands by the debris from the hydraulic mines. It is also known to you that some steps have been taken to remedy the evils in operation. Of the nature and extent

## The Injuries Inflicted.

You have already been informed somewhat fully by the reports of the State and consulting engineers. The damage done by hydraulic mining consists in (1) direct destruction of agricultural and other lands; (2) indirect damage to such land; (3) direct injury to the rivers and streams; (4) indirect damage to rivers and streams. The most serious direct damage to property has thus far occurred on the American, Bear and Yuba rivers. The nature of the damage is a practical burial of large areas under the mining detritus, or "slickens," and sand. The property so buried is, in fact, so completely deprived of agricultural value that, in the opinion of competent judges, it can, under the most favorable circumstances, be fit for nothing but raising swamp timber for from 15 to 30 years. As to the extent of the damage done in this way already, the State Engineer has reported the great injury of 43,546 acres of farming lands, rated at present probable valuation of \$2,728,300 for the land alone. The indirect damage to property is most apparent along the main streams—the Feather river and the Upper and Lower

## Sacramento River.

For the most part the difference between direct and indirect damage to property is more in the degree of harm inflicted than in its character. This, however, is not invariably the case. The injuries resulting from hydraulic mining are, in truth, so extensive that it requires both a comprehensive and careful survey to embrace them all. As the State sold the swamp lands on the condition that they should be reclaimed, it must be difficult to show that it is not under any obligation to remove obstacles which render the fulfillment of the conditions thus imposed by it impracticable. The indirect injuries which may be traced without any doubt of difficulty to hydraulic mining are, however, very extensive. In all these cases the future can be predicted from the past. On the one hand are lands already covered with the flood of sand and debris. On the other hand are lands threatened with this flood. And the flood is continually advancing. The lowlands of the whole Sacramento valley are, in fact, threatened

## With Unavoidable Destruction.

That is to say, that an area inclosing from 1,200 to 1,400 square miles of fertile territory is indirectly damaged, and is menaced with ultimate destruction. Nor is this the whole of the situation, for the injury done to the Sacramento valley extends, by a reflex action, to the lowlands of the San Joaquin, and to the lands about the upper bay by a direct movement. It may be said therefore without exaggeration that the indirect damage actually embraces an area extending from Orville and Chico to Benicia on the straits of Carquinez. It is necessary to bear in mind that the destruction of the navigability of the Sacramento river is involved. This would deprive the whole of northern California of competition in transportation. The wheat crop alone of that region may be estimated at 500,000 tons. It may also be fairly calculated that the removal of competition would result in a rise of freight rates to the extent of \$2 per ton. Thus, then, an additional tax of \$1,000,000 a year on the movement of the harvest alone is involved in this question, as concerns northern California. I have endeavored to ascertain, by reference to the assessment rolls and the report of the Board of Equalization, as well as from other sources, the amount of values menaced directly and indirectly by the effects of hydraulic mining. I have above stated the opinions of the State Engineer as to the extent of actual destruction already accomplished. He

puts it at \$6,000,000. Taking the counties of Colusa, Placer, Sacramento, Solano, Sutter, Yolo, Yuba, Butte and Tehama, and estimating the assessed value of the real estate other than town lots, and the improvements, and of the town lots and their improvements, and making what seems a sufficient deduction from the aggregate, I have arrived at the conclusion that the property in these counties threatened with partial or complete destruction cannot properly be placed at a lower estimate than \$60,000,000. Here, then, is \$6,000,000 already destroyed, and \$60,000,000 menaced with destruction. Nor must it be forgotten that this menace is not a mere possibility, but as certain as

## The March of a Glacier

Down a mountain pass. In considering the next question—namely, the results to the State of the destruction of its principal waterways—perhaps it is unnecessary to do more than refer to the voluminous evidences furnished by the State Engineer and the consulting engineers in support of the proposition that these waterways are in danger of destruction. The testimony of these scientific men is to the effect that unless sustained and systematic treatment is applied to the rivers they will shortly cease to be navigable.

## The Value of Land

Cannot be ignored, either. It is evident that if through any cause the cost of transportation is raised \$2 a ton, the products of the region so affected must by this change be put at an increased disadvantage equal to the removal of their lands from a market a distance represented by the enhanced ratio of transportation. I have endeavored to reach an approximate estimate of the loss of values to be apprehended in this direction from the destruction of the principal waterways, and I find that it cannot be fairly stated at less than \$1,000,000. It might appear that the only rational inference from the facts thus far given would be the desirability of putting a stop to

## Hydraulic Mining.

It, therefore, is proper at this point to make some observations on the value and importance of that interest. Hydraulic mining has been carried on in this State for 25 years. The present annual output of hydraulic mines is estimated at from \$12,000,000 to \$14,000,000. It is, therefore, apparent that an estimate of \$150,000,000 for the whole period of their working is not extravagant. It is equally clear that while no accurate estimate of their future output can be made, it is safe to assume that it will be larger than it has been in the past, since the extent of gravel-bearing claims remaining unworked is practically unlimited, and since many very extensive workings have either just been opened or are not yet opened so as to be largely productive. Enough is known to make it plain that the hydraulic mines have contributed greatly to the prosperity of the State, and will contribute still more largely in the future, if suffered to proceed. A very considerable population is supported by these mines. I estimate it at 30,000, and the indirect support is very much more extensive. The counties in which the principal hydraulic mines are situated may be said to depend almost entirely upon the mining industry. All values in those counties are therefore dependent upon the prosperity of this interest. What this involves may be perceived by reference to the comprehensive decline of values in Virginia City, consequent upon the depreciation of the mines on

## The Comstock Lode.

In that case the mining population was thinned out, the value of real property fell to panic prices, and the general effect upon the prosperity of the community was as disastrous as though every man in the city had been directly interested in the mines. Similar results must always follow where the intimacy of the relations between the various interests is as great as in the mining counties of California. The suppression of hydraulic mining, therefore, would in all probability be productive of a general collapse throughout this region. Not only would there ensue a positive and direct loss to the State in the cessation of auriferous production, but the entire industries, commercial activities and general civilization of the mining counties would be virtually destroyed, and it must be apprehended that the tax-paying as well as the wealth-producing capacities of those counties would be paralyzed. I have endeavored as much as possible to confine my observations to matters of fact and legitimate inference, but it is apparent that a great deal remains to be said on the subject of equities, for the discussion of which this is not the most proper place. It is nevertheless evident that the hydraulic mining interest is an important one. It may be said, as regards its annual output, to present a fixed capital of \$100,000,000, and directly and indirectly it affords support to a considerable population. Even the farmers in the valley, who occupy lands on the verge of

## The Mineral Area.

Owe a portion of their prosperity to these mines, which create a brisk demand for their produce, and a demand the loss of which would be severely felt. Clearly, therefore, it must be a very serious business to put a stop by legislation to this great industry, and it seems impossible that those who undertake to study the subject should conclude such a course to be necessary until it had been demonstrated that it was impracticable to save the rivers and the farms and cities without sacrificing the mines. The preliminary and the late surveys of the engineering department have been devoted to the elucidation of this problem. The engineers were

required to ascertain the extent of the injury, present and prospective, and whether remedial measures were available. Their reports have shown (1) that the extent and gravity of the damages and menace are far greater than had been commonly supposed; (2) that it was possible to counteract the ill-effects of hydraulic mining by a systematic treatment of the rivers; (3) that such a systematic treatment of the rivers was necessary in any case, since it would be impossible to meet the exigencies of the situation by merely stopping hydraulic mining. The most formidable danger to the lowlands is due to the deposit in the mountain streams and tributaries of enormous quantities of heavy sand which is being washed down lower every year. The deposit of sand must continue until the entire

## Sacramento Valley

is covered and destroyed, even though hydraulic mining should be stopped at once, unless remedial measures are adopted. In fact, it may be asserted that the stoppage of hydraulic mining in the present stage of the debris evil would produce no alleviation whatever. There is a mass of mining debris now collected in the canyons of the mountains sufficient to cover the Sacramento valley completely a couple of feet deep. It is, however, practicable, in the opinion of the State and consulting engineers, to deal with the situation, and in so doing to at once save the rivers and the mines. In other words, it requires to be ascertained whether the State can better afford to sustain the cost of reclamation than to bear the losses resulting from the destruction of property which must follow either (1) the stoppage of hydraulic mining, or (2) the abandonment of the rivers and agricultural lands and valley towns to the flow of

## The Advancing Wave of Debris.

I have endeavored to give you some adequate idea of the values represented on both sides. It has been shown that if the flow of debris is unchecked, to a positive loss of \$6,000,000 in land must succeed a further loss of \$60,000,000 in real property; that to this must be added at least \$100,000,000 for destruction of waterways, and fully \$1,000,000 a year in freights. On the other hand it has been shown that the hydraulic mines represent a fixed capital of \$100,000,000, that they support a large population, that they constitute the backbone of the commerce and industry of the mining counties, and that their suspension would necessarily involve the decline of all values throughout those counties, and the certain decay of that region of the State. It would appear from these considerations that the burden placed upon the State would have to be very heavy to outweigh the obvious desirability of avoiding the losses with which the commonwealth is threatened whether hydraulic mining is or is not suspended. The surveys of the engineers resulted in ascertaining the practicability of remedial measures, but at the same time showed that the subject was too extensive to be dealt with locally. It was particularly insisted on by the engineers that sustained and systematic treatment of the rivers must be undertaken or that it would be useless to attempt anything. While, therefore, they held out the encouraging consideration that by such a systematic treatment the condition of the rivers might be made even better than it had ever been, they contended that nothing less comprehensive than the methods they proposed would be adequate. It is important to observe that

## Captain James B. Eads.

The distinguished engineer of the Mississippi months, who was fortunately secured by me for consultation, and whose report has been placed in your hands, was especially emphatic on this head. In estimating the probable results of any successful plan of drainage, it became necessary to take into consideration not only the losses and dangers to be avoided, but the benefits to be gained. It was evident that the works which scoured out the river channels, and enabled them to carry their flood volume without inundating the country through which they flowed, would reclaim all the

## Swamp and Overflowed Lands

Along the lower Sacramento. A rough estimate of the values thus to be created by the carrying out of such a system justifies the belief that at least \$70,000,000 would in this way be added to the assessment rolls. Against all these considerations was to be placed the cost of the proposed works. It was not possible to arrive at a clear estimate of this expenditure, but it was believed by the engineers that it could not exceed \$10,000,000, and that it might not exceed \$5,000,000. This brings me to the Drainage Act, which was drawn, I believe, as a compromise measure, but which in its principles appears to meet the logical and equitable requirements of the situation quite closely. It was attempted in this bill to assess a benefit assessment as justly as possible upon the districts to be directly aided.

## The Hydraulic Miners

Were called upon for extra contributions, as seemed proper under the circumstances, and a single light tax of five cents on the hundred dollars was made general. I signed that act in the belief that its principles were just and sound, and I have seen no reason to change that belief since the law went into operation. The justice of a general tax for such a purpose appears to me to be thoroughly demonstrated by the existing relations between the State and the Federal Government. Whenever a State needs some internal improvement which it cannot compass from its own resources, it appeals to Congress, and the

latter rarely fails to concede what is demanded. San Luis Obispo, Los Angeles, San Diego and Alameda counties in this State are now petitioners for appropriations which can only be justified or granted by applying the principle of community interest underlying the measure considered. I am of opinion that California has a very equitable claim upon the general Government for aid in this connection, and I do not believe that Congress will hesitate to recognize it. Such governmental aid should at once be sought and earnestly insisted upon. The general Government sold the mineral lands to the miners and the agricultural lands to the farmers, and received due compensation therefor. It sold the mineral lands with a full knowledge of the fact that the beds of the streams were indispensable channels for the tailings created by mining operations. Since the mineral lands were sold for the

## Express Purpose of Mining.

And since the property so purchased cannot be profitably worked without great injury to the valleys and rivers of the State, our people believe that in equity the Government owes a large contribution to the cost of remedies for the injury inflicted. The precedents for liberal appropriations to aid in the solution of this problem are not wanting. The Government expended \$5,000,000 in the improvement of the navigation of the mouth of the Mississippi river, and the concession was made for considerations which find complete analogy and parallel here. The gold product of our mines flows into the channels of the world's commerce, and the auriferous deposits of our mountains are the treasures of the entire people. The preservation of the navigability of our river system should be the charge of the nation.

As regards the question of gain to the State, it is clear that such a rehabilitation of the principal waterways as will not only remove all danger of further disastrous inundations from the upper Sacramento valley, but will reclaim the swamp lands on the lower Sacramento, must add very largely to the taxable property of the community, induce settlement and cultivation, and promote the growth and prosperity, first, of the northern portion of the State, and second, of the whole State. To what extent these benefits would reach has been shown already in this message. Certainly the advantages to be anticipated by the State are sufficiently substantial. On the other hand, should the Legislature determine to refuse all further aid to the engineering works proposed, and should the debris consequently be permitted to flow on without operation, we have the judgment of the engineers to the effect that the Sacramento valley will at no distant date be rendered uninhabitable; that all the lowlands embraced within it will be destroyed; that the rivers will cease to be navigable; that the cities of

## Marysville, Sacramento and Colusa

(The latter by floods), together with the towns and villages between and around them, will be overwhelmed; and that, for all practical purposes of producing wealth and supporting the Government, this section of the State will be blotted out. But the case of the farmers who have been directly injured or threatened by the debris is not the only one in point. I have already referred to the fact that when the

## State Sold its Swamp Lands

It made their reclamation a prime condition of purchase. Now, when a State imposes such a condition it binds itself, by direct implication, to do nothing which can hinder or prevent the fulfillment of the condition by the purchaser. And it is clear that in the present case the State has not acted up to this requirement, since it has permitted the hydraulic miners to so treat the rivers that all plans of reclamation have proved futile. There can be no doubt of the responsibility of the hydraulic miners for that condition of the rivers which has caused the capital of our swamp-land cultivators to be wasted. Nor can there be any more question as to the concern of the State in the general situation.

I come now to the question of the necessity for some sustained and systematic treatment of the rivers. I am not prepared to express an opinion upon the remedial measures which are proposed by the engineers. It is for you to determine what course shall be taken in regard to them, and it is for you to judge whether they meet the requirements of the situation. But I consider it my duty to point out, to the best of my ability, the need which appears to exist—the imperative need, I may say—for some scientific and comprehensive mode of treatment. The reports of the State Engineer, and those of the consulting engineers, Capt. Eads and Col. Mendell, contain many serious and even startling expressions in this connection. They concur in declaring that there must be a well-devised, carefully-planned, all-embracing system of remedial action, and that nothing less than this will arrest the very grave dangers which

## Menace the State.

They tell us, as the result of their laborious researches, that the lower river channels are raised by the deposits of sand in them; that the upper river tributaries are given a torrential character by the ever-increasing steepness of grade imparted to them in the same way; that, consequently, they bring down their flood waters more swiftly and in greater volume than ever; and that the lower river channels, being choked with sand, are less able than ever to receive and carry this increased volume of water. They tell us that while through these agencies

[CONTINUED ON PAGE 53.]



## THE ENGINEER.

## What Engineers Have to Think About.

The Council of the Institution of Civil Engineers, London, have invited communications of a complete and comprehensive character on any of the subjects included in the following list, as well as on other analogous questions. For approved original communications, the Council will award premiums arising out of special funds bequeathed for the purpose.

1. The frictional resistance of various soils on piers and piles.
2. The most useful sections of rolled iron for structural purposes, having regard to economy of material combined with strength.
3. The present system of making steel for railway purposes, and the properties and character of the material.
4. Machinery for steel making by the Bessemer and the Siemens processes.
5. The tempering of steel and the influence thereby produced on its strength.
6. Experiments on the strength of materials used in construction, with descriptions of the testing machinery employed to ascertain the same.
7. The method of protecting metal work exposed to corrosion, with examples.
8. The comparative effect of "dead" and "live" loads in straining materials and structures, with the factor of safety considered desirable for various proportions of such loads.
9. The forms of staging, scaffolding and centering used for the support of structures during erection.
10. The modern practice of bridge building in Germany, especially with reference to the details of construction and the substitution of bar and angle iron for wide flange plates.
11. The different methods of erecting metallic bridges, with examples of rolling over, building out, lifting bodily, etc.
12. The design and construction of a steel bridge, with particulars of the weight and cost, and of the tests to which it has been subjected compared with an iron bridge of the same span.
13. The action of high winds on lofty and exposed structures, and the best methods for determining the force of the wind.
14. The comparative cost of transport by land and by water.
15. The resistance to traction of vehicles on roads.
16. The best system of working suburban passenger traffic on railways.
17. The most suitable motive power for underground railways.
18. Resistance on railway curves, and recent expedients to diminish the same by lubricated tires, divided axles, loose wheels, or otherwise.
19. The measures hitherto taken, and still necessary for the relief of the mid-land and eastern counties of England from floods.
20. The flow of water through pipes and conduits, with experiments in verification of the existing formulae and suggested amendments and improvements.
21. The mechanical separation and chemical treatment of sewage with analyses of the effluents and of the sludge, and statements of cost in proportion to population and rateable value.
22. The modes of regulating the action of storm overflow from sewers, and the flushing of sewers.
23. The methods used for determining the discharge of rivers with a description of the floats and current meters employed for the purpose.
24. The works carried out on the continent of Europe for the improvement of rivers and of inland navigation generally.
25. The design and construction of building slips for large vessels.
26. The construction of tide gauges and the usual method of carrying out a systematic series of tidal observations.
27. The type of steam engine best adapted for ordinary factory purposes, in respect to economy in the use of steam, as well as in first cost, and in cost of maintenance.
28. The best method of testing steam engines—independent of their boiler—having regard to accuracy of the results and ease with which the tests can be carried out.
29. The modern practice in the design and construction of hoilers.
30. The prevention of smoke from furnaces and domestic fire grates.
31. The use of compressed air as a motive power, particularly as applied to machinery in mines and for traction on tramways and in tunnels.
32. Wind and water as motive powers, compared with steam power and the motors most suitable for utilizing them.
33. The various descriptions of pumps employed for raising water or sewage, and their relative efficiency.
34. The different systems of lifts in use in warehouses and in dwellings.
35. The design and most suitable materials for the construction of bins for warehousing grain.
36. Machinery and vessels for high speed steam navigation.
37. The special construction of vessels for the reception of railway trains on deck, indicating the arrangements for the shipping of such trains on their own wheels at various states of the tide.
38. The relative loss of power due to friction in various parts of machinery.
39. The various classes of lubricants with

records of experiments, showing their relative values and a description of the mode of testing them.

40. The methods and machinery employed in sinking and in working deep coal mines.
41. Coal depots for ocean steamers, the various points involved in their management and the methods of preserving large quantities of coal from deterioration.
42. The methods employed in securing large and irregular-shaped mineral workings, for example the Almaden mines, the great Comstock lode, etc.
43. The combined use of fire-brick, iron and other materials for resisting high temperatures in blast furnaces, kilns, pottery, ovens and similar structures.
44. The disposal and utilization of slags from various smelting processes.
45. The management of underground waters in mining districts, and the relative economy of distributed or trunk-pumping engines, adits, etc., in particular cases.
46. On proportioning mains for the distribution of water and gas.
47. The employment of the electric current for the transmission of sound, and the use of the telephone for practical purposes.

## Useful Information.

## Points in Physiognomy.

Large eyes tell of ardor and activity; small ones of sluggishness, calculation and perhaps cunning. A fullness, or prominence of the eyes indicates a talent for talking and writing with great fluency of language, and especially on generalities. The little knot of wrinkles that radiate from the corner of the eyes in the middle-aged, testify to thorough honesty and truthfulness. The feature may often be noticed in business men of known probity.

The various color of eyes have each their admirers. The light tints signify delicacy, amiability and refinement; the dark eyes power and strong passions, though the sluggish temperament often does not call these into activity. Blue speaks of tenderness and extreme sensibility; brown goes with a frank, womanly nature; hazel is a sign of talent, and of a better head than heart. Give no confidence to a woman whose small, black eyes flash like a bead, for she is prone to selfishness and tattling.

Noses are as diverse in crosses as can well be, though for convenience they are grouped into five well-known classes. The Roman for the positive and aggressive man, the harsh-faced conqueror who cares nothing for the slaying of multitudes to achieve his own fortunes. Its peculiarity is the production of a ridge near the upper end. The Greek is the classic nose, denoting artistic tastes and keen refinement. It has throughout a regular and delicate outline. The Jewish or hawklike nose is known to all. It fits the sharp trader, the speculator and the money dealers. The celestial, or turned-up nose, is merely the snub, lengthened a little. It is found in inquisitive children, and often among the fair sex.

The mouth is the most tell-tale feature of the whole countenance. Have the lips retained the fair curves of childish purity, or has an indulgence in drinking or other dissipation made the lips coarse and flabby? Here, as elsewhere, a delicate shape means a fine susceptibility, while a coarser form reveals a rude nature. Quite a number of little muscles cluster about the corners of the mouth, and their involuntary motions often let out a secret that the lips and eyes have concealed. A steady friend is not to be looked for in one whose lips are perfectly smooth, but, instead, where the red is crossed with upright wrinkles. Hospitality displays several slightly curved wrinkles, outward and downward from the corners of the mouth. Large and full red lips stand for a loving and faithful disposition.

Less attention is usually given to studying the chin than it deserves, as it is often concealed by a beard. It is intimately connected with the cerebellum or basis of the brain, which is the organ of vital power—so much so that if one be poorly developed the other will be also. The deeper and wider the chin and lower jaw, the more will be the unconquerable firmness even to audacity, and the larger will be the corresponding development of the cerebellum.—*Golden Days.*

**SOLID MUCILAGE.**—Mucilage in a convenient solid form, and which will readily dissolve in water, for fastening paper prints, etc., may be made as follows: Boil one pound of the best white glue, and strain very clear; boil, also, four ounces of isinglass, and mix the two together; place them in a water bath—a glue pot will do—with one-half lb. of white sugar, and evaporate until the liquid is quite thick, when it is to be poured into molds, dried, and cut into pieces of convenient size.

**PAINT FOR BASEMENT WALLS.**—A dry coating for basement walls may be made as follows: Take 50 lbs. of pitch, 30 lbs. of resin, 6 lbs. of English red and 12 lbs. of brick-dust. Boil these ingredients, mix them and stir thoroughly, then add about one-fourth the volume of oil of turpentine, or enough to make it flow easily, so that a thin coating may be laid on with a whitewash or paint brush. Walls thus coated are proof against dampness.

**SPONTANEOUS COMBUSTION OF SOFT COAL.**—The Boston Manufacturers' Fire Insurance Co. states that at present rates of prices semi-bituminous and soft coals are coming into more general use than they have been, especially culm or fine coal. Members are warned that, with few exceptions, such coals are very liable to spontaneous combustion, if stored when the least wet or damp in closed sheds where there is little or no circulation of air. If such coal is not protected from being wet, it is said to deteriorate. The company objects to the storage of semi-bituminous or bituminous coal in or under any building that would expose a risk taken by this company to danger if it took fire. It is suggested that a roof may be sufficient to protect soft coal from being much wet, and that, under a roof not confined at the sides, there would probably be such a free circulation of air as to prevent spontaneous combustion.

**THE UTILIZING OF THE TIDES.**—A Philadelphia engineer has invented, it is claimed, a machine by which the power of the tides can be utilized. Numerous plans have been proposed for the accomplishment of this most desirable end, but only under exceptional conditions have they been practical or economical. If the new device can harness the tide in an open channel, so as to convert any considerable portion of the vast power into working force, the inventor will rank among the great benefactors of humanity. Emerson says somewhere: Hitch your wagon to a star. A device for utilizing mechanically the free tides, as they sweep along our shores, would come next to that, since it would enable us, through converters and carriers of electricity, to hitch our wagons to the sun and moon.—*Sci. Am.*

**WHAT WOMEN INVENT.**—Some one who has taken the trouble to count the patents issued to women finds that the number for the year ending July, 1880, was 70, and 10 more than the average. Most of the inventions of women have to do with household appliances. Among the past year's are a jar lifter, a hag holder, a pillow-sham holder, a dress-protector, two dust pans, a washing machine, a fluting iron, a dress chart, a fish boner, a sleeve adjuster, a lap table, a sewing machine treadle, a wash basin, an iron heater, sad irons, a garment stiffener, a folding chair, a wardrobe bed, a weather strip, a churn, an invalid's bed, a strainer, a milk cooler, a sofa bed, a dipper, a paper dish, and a plating device.

ENGLISH papers mention the casting of a 43-ton anvil at Motherwell, as a piece of exceptional skill. Pittsburg makes one almost four times larger, and says very little about it.

## GOOD HEALTH.

## Salves and Plasters.

The tinsmith or plumber who goes through a year's work at his trade without a severe cut or burn is fortunate, but he considers himself equally fortunate if, in the case of a severe injury, he escapes from the dangers of salves and plasters. In regard to their injurious effect upon the skin, Dr. Van der Wrede, whose skill in medicine is quite equal to his knowledge of science, says:

"Plasters and salves are more dangerous even than oil silk or rubber overshoes, as they are usually applied to wounds and sores, and in many cases produce more harm than they do good as they usually protract the cure, and often prevent it entirely. The cause is simply that plasters and salves are mostly waterproof, and therefore interfere with the natural function of the skin; if either of them is placed on a sound portion of the skin, and kept there for a few days the skin becomes sore. Their application is often the cause of the difficulty in healing wounds. Scores of cases have come under our notice where our advice to discontinue the use of so-called healing salves caused a finger which had been sore for months and kept sore by the continual application of different kinds of salves, to heal rapidly as soon as the use of salves was discontinued.

"It is the same with plaster; we have seen it over and over again, that a cut wound which had been covered with a plaster to shut off the air, as a foolish prejudice teaches, had a most protracted and painful course, while a similar wound, simply treated by bringing the edges together and covered with a piece of linen to keep it clean healed in a few days. This keeping clean does not mean to keep off dust and foreign substances, but to clean off the dried blood which may cover the cut. It is even often advisable to put some blood over the edges of the wound after they have been brought together with a few stitches or narrow cross strips of plaster, which, however, must never be allowed to cover the wound. It should not be lost sight of that the skin is made for contact with the air, and that this contact is necessary, not only to keep the skin in healthy condition, but also when repairs are going on; therefore no water-proof plaster should interfere. But blood is soluble in water and absorbs air, and it has a great healing power; in fact, there is no healing salve so efficient as the blood which often covers a wound, and which, therefore, must not be interfered with, by any means.

Under a dried crust of the blood repair goes on actively, as blood contains all the elements required for such repair, and renewal of tissues

wants the nourishing ingredients which are found in the blood.

From long experience of both methods of treatment, we can heartily interpose all that the doctor says. We have frequently treated severe burns by pasting a sheet of white tissue paper over them, using pure gum-Arabic freshly dissolved in water. The object of having the gum fresh was to make sure that it had not soured or fermented. Burns which have begun to fester from the use of oils or ointments will frequently yield at once to such treatment, the swelling and inflammation quickly subsiding, healing beginning and the pain ceasing.

## Chian Turpentine in Cancer.

The use of Chian turpentine for cancer created quite a sensation a few months since throughout the medical world; but the promises of its usefulness held forth by a few individuals do not seem to be sustained in general practice, and now we have on authority of the *Lancet* that at a recent meeting of the Medical Committee of the Middlesex Hospital, London, it was resolved that no more Chian turpentine should be ordered for the treatment of cancer, as, after a prolonged and careful trial, it had been found that its results were perfectly negative. Dr. Henry Morris, a distinguished English physician, after giving Chian turpentine a pretty thorough trial in several cases of cancer, the details of which he gives in the *Lancet*, arrives at the conclusion that this recently vaunted remedy is utterly valueless in this dread disease. He says: "I am not able to report that there is a single symptom over which the drug seems to exercise even frequently, not to say constantly an influence. It cannot be relied upon to assuage pain, to diminish or alter the character of the discharges, to check hemorrhage, or promote the destruction of the growth by ulceration or sloughing. In the few cases in which the patient at first thought she was benefited, the impression was due to that 'clutching at straws' tendency, that is so often observed in persons suffering from lingering and incurable disease, and to her being encouraged to think that she was taking a new and certain cure. Rest, regulation of diet, attention to the bowels, an anodyne at night, and the extra local cleanliness which follows from the use of injections and lotions, will of themselves, and without any internally administered drug, give temporary ease and improvement."

**BOYS AND SMOKING.**—A timely note of warning is sounded by the New York *Times* against the growing evil of smoking among boys. It states that "careful experiments lately made by a physician of repute prove that the practice is very injurious." Of 35 boys, aged from 9 to 15, who have been in the habit of smoking, in 27 he found obvious hurtful effects; 22 had various disorders of the circulation and digestion, palpitation of the heart, and more or less craving for strong drink; and 12 had ulceration of the month. All were treated for weakness and nervousness, but successfully only after they had relinquished smoking. The *Times* says of the smoking: "One of the worst effects is the provocation of an appetite for liquor, which, indeed, is not confined to the young, but which grown persons are better able to manage. When boys drink to excess they are almost invariably smokers; and it is very rare to find a man over fond of spirits who is not addicted to tobacco. Men who want to give up drinking usually have to give up smoking at the same time, for they say that a cigar generally excites a desire for liquor very hard to control." The great increase of smoking among boys in recent years is one of the alarming tendencies of our time. There ought at once to be inaugurated a vigorous anti-tobacco crusade throughout the land.

**SENSIBLE DRESSING.**—There is a class of women one meets with every day, whose dressing is above reproach. They go out to walk, not to show their clothes, but to add to their line stock of health. They look as if they could sit a horse well, and as if they used often the luxury of a bath. They wear thick-soled shoes, with low, broad heels, shapely and well-fitting. Their walking and church suits are of cloth, plainly made, but of exquisite fit. Their gloves and bonnet strings are above reproach. The hair, well cared for, is prettily waved or curled about the forehead, and worn low, to show the shape of the head—a style that artists love. Unless nature has been very niggardly no false hair is allowable. The bonnet is close and very becoming, and the face is protected by a veil. An ample parasol or umbrella is ready as protection against sun and rain. What fault can the most censorious man find with a costume like this?

**DIGESTIVE PRINCIPLE OF FIG JUICE.**—M. Bouchut, who has been investigating the digestive principle of the papaw tree, has extended his researches to the common fig, and the result of preliminary experiments, carried out upon the milky juice collected from a fig tree in April last, seems to show that this juice contains a powerful ferment capable of digesting albuminoid matters. As much as 90 grammes of fibrine, added in eight successive portions at intervals of one or two days, to five grammes of the milky juice, and kept at a temperature of 50° C. was for the greater part digested, leaving a small amount of a white homogeneous residue, and the solution having the odor of good broth.





W. B. EWER.....SENICIA EDITOR.

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Saturday Morning, Jan. 22, 1881.

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## The Week.

The Legislature is still in session, and the "hoom" in bills still continues. Great numbers of bills are introduced, which will of course never be even considered. We give in another column an abstract of such business as will be of interest to our industrial readers.

We give in other columns of this issue important documents which every one should read. These are the Chinese treaties, and the Governor's special message on the debris question.

Concerning the latter it is only necessary to say that it gives a clear and distinct description of the question as it hears on both the mining and agricultural industries. The question is now being discussed at Sacramento quite carefully.

As to mining news our regularly weekly summary gives all that is current, and we commend its perusal to our readers. It will be seen that the miners everywhere are hard at work developing their properties. It may be noticed, moreover, that in this State at least, there is less "waiting for capital" than formerly, the miners pitching into work as if they meant business. This is a favorable feature in the mining industry. Work, not waiting, will pay best in the long run. The miner can work and capital will come to him more readily than it will when he waits without working.

Cloudless skies and sunny days close the week. While the telegraph brings us news of violent storms and very bad cold weather from nearly all over the world, we are here enjoying a climate appreciated the more by the great contrast.

THE Utah and Northern Railroad Company has 21 locomotives actively employed and 15 new ones ordered. As each locomotive requires 10 box and two flat cars, the total rolling-stock for 1881 will be 720 cars and 36 locomotives.

## Metallurgical Centers.—Continued.

The presence of gold as well as silver in an ore which is to be leached by the usual method, necessitates two chloridizing and two leaching operations. The silver is chloridized by roasting the powdered ore with salt; the gold by exposing the roasted and slightly-moistened ore to the action of chlorine gas.

Leaving out of consideration that limited class of silver ores which can be successfully treated by amalgamation without roasting, we may say that roasting with salt is indispensable in extracting silver from non-smelting ores. The subsequent chlorination for gold is not so expensive as many suppose. At San Francisco prices for material, the chlorine, in the ordinary way of working, does not cost more than 80 cents per ton of ore treated. In extensive works near Carson City, purchasing material in large quantities, and with means of avoiding the waste which occurs in small works, it need not cost 50 cents per ton of ore. The item of additional labor, beyond that required for silver alone, is inconsiderable in any case, and would be inappreciable in large works. Moreover, it may safely be asserted that the extra expense of the gold extraction would be covered by the additional yield of silver consequent on the action of chlorine gas on the roasted ore. The leaching for gold takes the place of the washing, which is always necessary before roasted silver ore is leached with "hypo" for the extraction of silver, so that it cannot be considered an extra expense.

The first objection is thus disposed of, so far as concerns ores in which the gold is distinct from the silver, as is commonly the case. The presence of an alloy of the two metals presents no difficulty, if the particles are very fine; otherwise, the silver chloride, forming a crust on each particle, impedes the action of the chlorine on the gold. In the latter case recourse may be had to alternate leachings, beginning with warm brine for silver, and following that with chlorine water for gold, or by Hofmann's method of leaching with hypo for silver, partially drying the ore, and then chlorinating for gold in the usual way. The latter process has been applied with great success to rich concentrations containing much lead, which was removed by washing the roasted ore with hot water before extracting the silver, but in a complete establishment such material would be smelted.

Leaching with warm chlorinated brine, under pressure, is one of the few known methods of simultaneously extracting gold, silver and copper, which we do not at present insist on, because of certain difficulties in its practical application, which, however, may probably be overcome.

The most serious obstacle to the application of leaching is, the want of permeability in many crushed and unwashed ores, caused by the presence of clay. This trouble can, in many cases, be overcome by the application of atmospheric pressure on the surface of the leaching liquid in a filtering vat, through the agency of what is called a *suction pipe*, containing a vertical column of the liquid from 6 to 20 ft. deep below the vat; or, by means of a pump drawing from the vats below the filters. In other cases it is met by the method of *decantation*, which consists in agitating the ore, together with the solvent, in a large vat, allowing the ore to subside, and drawing off the clear solution of the metals. Another method by which ores, which were almost impervious to liquids by way of filtration, have been successfully leached was, by allowing a small stream of the solvent to flow into the lower part, and out of the upper part, of a vat containing the ore, the latter being kept in suspension by gentle stirring, and the rise being so deep that only clear liquid could rise to the outlet. This method is capable of being systematized so as to be very convenient and economical, especially in regard to copper and silver.

In general, however, this class of ore would be subjected to a process of concentration, by which the slimy matter would be removed, carrying with it a portion of float gold and silver chloride, etc., and would be, after submergence in reservoirs, worked off in the smelting furnaces, or amalgamated; the heavier portions would be at once roasted and leached, or separated, by sizing and jigging, into smelting and roasting material, etc. The greater portion of the quartz or other gangue matter would thus be eliminated.

Low grade ores of copper and silver can be economically and thoroughly treated for both metals at once by the Hunt and Douglass leaching process, the silver being precipitated in metallic state by cement copper enclosed in porous envelopes, on which the pure silver will grow in beautiful crystals, uncontaminated by mixing with the finely divided copper. The copper can, in a similar manner, be obtained in a state of purity by precipitation on hags containing an impure iron sponge, made at the works from ferruginous tailings of roasted and chlorinated aniferous sulphurets, or from magnetite or other rich iron ore abounding in the mountains. However, old iron in abundance could be obtained for a long time in the vicinity of Carson City.

The tailings, from auriferous sulphates treated by chlorination and leaching, make an excellent flux for smelting galena or quartzose ores, and any gold they may contain is recovered in the

operation. A pigment for common red paint may also be made from this material by a simple process of elutriation.

The leaching processes possess important advantages over amalgamation for ores, which must in either case, be roasted, as would certainly be the case with the concentrations from the low-grade Comstock ore, a material which presents none of the difficulties here pointed out. The advantages of leaching consist less in the diminished cost of this working plant, which, in a permanent establishment with abundant capital, would be a secondary consideration, than in the current cost, which is of the utmost importance. The apparatus once erected is almost indestructible by use, hence stoppages for repair or renovation are reduced to a minimum, as is also the cost of power. The cost of material for the leaching is not greater than that of quicksilver, etc., for amalgamation, and the results obtainable are better. Copper in the ore, which causes difficulty and expense in amalgamation, is, in leaching, a source of profit. The risk of loss through carelessness or accident, is less in leaching, and with a proper arrangement of dumping-vats, and a stream of water for the removal of tailings, the labor of handling the ore is about the same. Even in the matter of obtaining the hullion in the form of bars from the crude products of the process, the advantage is not on the side of amalgamation, unless where very fine hullion is got, and then some considerable benefit in the matter of discount results, in leaching, from the circumstance that the gold is obtained separately, while the silver can always be got at least 800 fine, and frequently much finer.

## A State Hospital and Asylum for Miners.

The following is the full text of the bill for a hospital for miners, introduced in the Assembly by Joseph Wasson, of Mono.

SECTION 1. There shall be erected, as soon as conveniently may be, upon some suitable site, to be determined and obtained as is hereinafter provided, a public hospital and asylum for the reception, care, medical and surgical treatment and relief of the sick, injured, disabled, and aged miners, which shall be known as the "California State Miners' Hospital and Asylum."

SEC. 2. The Governor shall nominate, and, by and with the advice and consent of the Senate, appoint five persons, to serve as Trustees of said institution, who shall be a body politic and corporate, by the name and style of the "Trustees of the California State Miners' Hospital and Asylum," and shall manage and direct the concerns of the institution, and make all necessary by-laws and regulations, and shall have power to receive, hold, dispose of, and convey all real and personal property conveyed to them by gift, devise or otherwise, for the use of said institution, and shall serve without compensation. Of those first appointed, two shall serve for two years, and three for four years; and at the expiration of the respective terms, each class thereafter shall be appointed for four years. A vacancy in said Board, from any cause, shall be filled by appointment by the Governor for the unexpired term.

SEC. 3. The said Trustees shall have charge of the general interests of the institution; they shall appoint the Superintendent, who shall be a skillful physician and surgeon, subject to removal or re-election no oftener than in periods of ten years, except by infidelity to the trust reposed in him, or for incompetency.

SEC. 4. The Trustees, by and with the consent of the Governor, shall make such by-laws and regulations for the government of the institution as shall be necessary; they shall appoint a Treasurer, who shall give bonds to the people of the State of California for the faithful discharge of his duties; and they shall fix the compensation of all officers, assistants, and attaches who may be necessary for the just and economical administration of the affairs of said institution.

SEC. 5. Indigent miners shall be charged for medical attendance, surgical operations, board and nursing while residents in the hospital and asylum, no more than the actual cost. Paying patients, whose friends can pay their expenses, and who are not chargeable upon townships and counties, shall pay according to the terms directed by the Trustees.

SEC. 6. The several Boards of Supervisors of counties, or any constituted authority in the State having care and charge of any indigent, sick or aged person or persons, if satisfactorily proven by them to have been miners, shall have authority to send to the "California State Miners' Hospital and Asylum" such persons, and they shall be severally chargeable with the expenses of the care, maintenance and treatment, and removal to and from the hospital and asylum of such patients.

SEC. 7. The Trustees shall annually, at such time as the Governor may designate, report to him for transmission to the Legislature, such a statement as he may require as to the management of the said hospital and asylum.

A FURNACE FOR WALKER RIVER.—The whole of the cast-iron work for the smelting furnace which is being put up by Senator J. P. Jones and others in the Walker River country has been shipped from this city. The smelter will soon be turning out ingots of copper.

LAST week Butte, M. T., shipped over \$40,000 in hullion. At this rate that lively little town will soon achieve her promised eminence.

## Physical Studies of Lake Tahoe.—No. 4

[Written for the Press by PROF. JOHN LE CONTE.]

## Colors of Transparent Liquids.

So far as known, the colors of transparent liquids are due to the modifications of white light produced in the interior of the substances traversed by the luminous rays. Besides the well-known chromatic phenomena arising from the refraction and dispersion of light (which are out of the question in relation to this subject under consideration), there are, in this class of bodies, three recognized causes of coloration, viz.: 1st, selective absorption of transmitted light; by which, through the extinguishing of certain rays, the emergent light is colored. 2d, Selective reflection of light from the interior of the liquid; by which, both the transmitted and reflected rays are colored. 3d, Fluorescence; by which colors are manifested by a sort of selective secondary radiation, in which light waves of "greater length than those of the exciting rays are emitted from the interior of the liquid. Although the admirable researches of G. G. Stokes, Edmond Becquerel, Alex. Lallemand, Hagenbach, and others, on the "Illumination of Transparent Liquids," proves that a greater number of such bodies possess the property of fluorescence than was formerly supposed, yet all investigators concur in classifying pure water among the non-fluorescent liquids. Hence in the case of this liquid, in a state of purity, the admitted causes of coloration are reduced to two, viz.: Selective absorption and selective reflection in the interior of the transparent mass.

If the liquid traversed by the light is so constituted that none of the rays are reflected from its interior parts, while selective absorption is active, then the transmitted light is alone colored, according to the rays that may be extinguished by absorption. On the other hand, in transparent liquids in which there is no absorption of light, both the transmitted and the reflected light may be colored by selective reflection. For, it is evident, that if some of the rays are selectively reflected in the interior of the transparent mass, the transmitted light and the reflected light must present different colors. It is, likewise, obvious, that if all of the white light entering the transparent medium is thus disposed of, the transmitted light and the reflected light must present tints which are exactly complementary. In most cases, however, when selective reflection occurs, there will generally be some selective absorption; consequently the color by transmission will not always be exactly complementary to the color by reflection. In fact, this exact complementary relation can not be realized when any portion of the light is absorbed. Moreover, in many cases in which there is a rapid absorption of particular rays, the transmitted and reflected lights are of the same color. For example, there are large classes of bodies (such as solutions of indigo, sulphate of copper, etc., and also various colored glasses), which are of the same color by reflection and transmission. In such cases, the rays of all the other colors are speedily extinguished by absorption, while a portion of the incident characteristic color-rays are reflected, and the rest are transmitted. Thus, in many blue colored solutions, not only is the transmitted light blue, but the blue tint is visible in all directions by means of the diffused light. *Opalescent Aqueous Media.* It is now well established that finely divided substances suspended in water, impart to it the property of diffused selective reflection, whereby certain chromatic phenomena are produced. It has been long recognized, that if about one part of milk be added to 50 parts of distilled water, the presence of the diffused milk globules in the midst of the liquid, imparts to it a bluish tint by the scattered reflected light, while the transmitted light acquires a yellowish color. Similar phenomena are observed when delicate precipitates of magnesia, or of amorphous sulphur, are diffused in pure water; and, likewise, when weak alcoholic solutions of certain essential oils are mingled with this liquid.

The admirable experiments of Ernst Brücke, in 1852 (Pogg. Ann. Vol. 88, p. 363-385), prove that mastic and other resins which are soluble in alcohol, will be precipitated in a finely divided state when added to water; and that when such a precipitate is sufficiently diluted, it gives the liquid a soft, sky-like hue by the diffuse reflected light, while the transmitted light is either yellow or red, according to the thickness, of the stratum traversed. These results have been abundantly verified by more recent experiments, and notably by those of Tyndall (probably about 1857), and by those of the writer during the years 1878 and 1879. The suspended particles of resin are so extremely attenuated, that they remain mingled with the water for months, without sensibly subsiding. In many instances, they are so fine as to escape detection by the most powerful microscopes—they are ultra-microscopic in smallness. Media which possess the property of decomposing compound white light by selective reflection, have been characterized as opalescent. The distinguishing characteristics of opalescent liquids are: 1st, That the reflected and transmitted lights are different in color; and 2d, that the tints of the two colors are more or less complementary. It is evident, however, that when the liquid exercises any selective absorptive action on light, the tints of both the reflected and



transmitted lights will be more or less modified, according to the character of the rays which are withdrawn by absorption. Hence, it follows, that the tints by diffused reflection and by transmission may deviate more or less from the exact complementary relation.

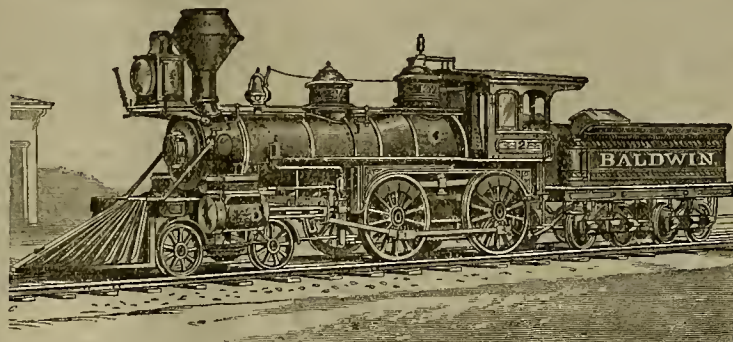
#### Color of Pure Water.

In the investigation of the "Canases of the colors of the waters of certain lakes and seas," it is manifestly of primary importance to determine the color of pure water; for, if it is inherently colored, the tints afforded by impurities must be modified by the admixture of the hues proceeding from this liquid itself. Although pure water in small masses appears to be perfectly colorless, yet most physicists have been disposed to admit an intrinsically blue color as belonging to absolutely pure water, when viewed in sufficiently large masses. Thus, Sir I. Newton, Mariotte, Euler, Sir H. Davy, Count De Maistre, Arago, and others, ascribe the azure tints of the deep waters of certain lakes and seas, to the selective reflection of the blue rays from the molosses of the liquid itself; while the green and other tints exhibited by other waters, are due to the impurities or to various modifications and admixtures of reflected light from suspended materials and from the bottom. More recent investigations seem to furnish some clue to the solution of this problem. R. W. Bunsen, in 1847, was the first to test the color of pure water by direct experiment (Ann. der. Chem. und Pharm. Vol. 62, p. 44-45, 1847). He provided himself with a glass tube 5.2 centimeters in diameter and 2 meters long, which was blackened internally with lamp-black and up to within 1.3 centimeters of the end, which was closed by a cork. The tube being filled with chemically pure water, and pieces of white porcelain being thrown into it, it was placed in a vertical position on a white plate. On looking down through the column of water at the bits of porcelain at the bottom, which were illuminated by the white light reflected from the plate through the rim of clear uncoated glass at the lower extremity, he observed that they exhibited a pure blue tint, the intensity of which diminished as the column of water was shortened. The blue coloration was also recognized when a white object was illuminated through the column of water by direct sunlight, and viewed at the bottom of the tube through a small lateral opening in the black coating. It is evident that the blue tints manifested in these experiments, were those of the transmitted light; and they indicate that pure distilled water absorbs the luminous rays constituting the red end of the spectrum more copiously than those of the blue extremity. But they do not touch the question of the color of the diffused light reflected from the interior of the mass of water itself. About 1857, John Tyndall confirmed the results of Bunsen's experiments, in the following manner: "A tin tube, 15 ft. long and 3 inches in diameter, had its ends stopped securely by pieces of colorless plate glass. It is placed in a horizontal position, and pure water is poured into it through a small lateral pipe until the liquid reaches half way up the glasses at the end; the tube then holds a semi-cylinder of water and a semi-cylinder of air. A white plate, or a sheet of white paper, well illuminated, is then placed a little distant from the end of the tube, and is looked at through the tube. Two semi-circular spaces are seen, one by the light which has passed through the air, and the other by the light which has passed through the water. It is always found that while the former semicircle remains white, the latter is vividly colored." Prof. Tyndall was never able to obtain a pure blue, the nearest approach to it being a blue-green. When the beam from an electric lamp was sent through this tube, the transmitted image projected upon a screen was found to be blue-green when distilled water was used. ("Glaciers of the Alps," Part 2d, (6) "Color of water and ice," Am. Ed. p. 254-255, Boston, 1861). It will be noticed, that Prof. Tyndall makes no allusion to the color of the diffused or scattered light; indeed, his tin tube rendered it impossible for him to observe it. It is evident, that at this time (1857), this sagacious physicist was disposed to ascribe the blue tints observed in purest natural waters, exclusively to their absorbent action on the transmitted light. Thus, extending the analogy of the action of water on dark heat, to the luminous rays of the solar spectrum, he says: "Water absorbs all the extra red rays of the sun, and if the layer be thick enough, it invades the red rays themselves. Thus, the greater the distance the solar beams travel through pure water, the more they are deprived of those components which lie at the red end of the spectrum. This consequence is, that the light finally transmitted by water, and which gives it its color, is blue" (op. cit. supra, p. 254). According to this view, it would seem that pure water is really colored in the same sense as a weak solution of indigo; that is, it is blue both by reflected and transmitted light.

In Dec., 1861, W. Bestz, of Erlangen, obtained results analogous to those of Professors Bunsen and Tyndall, by the somewhat imperfect method of looking through considerable thickness of distilled water at the transmitted light made to pass, by repeated reflections across a box 10 inches long filled with this liquid. The transmitted light ultimately became dark-blue, "with a very feeble tinge of green." (Pogg. Ann. Vol. 115, p. 137-147, Jan., 1862; also, Phil. Mag. 4th series, Vol. 24, p. 218-224, Sept., 1862). My own experiments, executed on various occasions in 1878-1879, afford complete

verification of the results obtained by the preceding physicists. My arrangements were similar to those of Prof. Tyndall, except that a series of three glass tubes—of about 3 centimeters in clear internal diameter connected by India-rubber tubing, and having an aggregate length of about 5 meters—was employed instead of the tin tube used by him. Moreover, instead of the electric beam, I employed solar-light thrown into a large, darkened lecture room by means of a "Porta-Lumiers;" the small beam passing through the first diaphragm at the window, being rendered nearly uniform in diameter by the interposition of a secondary screen, with a small aperture in it, just before the light entered the end of the horizontally adjusted series of tubes. By this arrangement, an approximate mathematical ray was obtained, which secured the transmission of the light along the axis of the column of water, without the possibility of the emergent beam being mixed with any light reflected from the internal surfaces of the glass tube. In every instance in which distilled water was used, the tint of the image of the emergent beam received upon a white screen, was either greenish-blue or yellowish-green; the former tint seemed to characterize the summer and the latter hue the winter experiments.

Likes Prof. Tyndall, I failed to obtain a pure



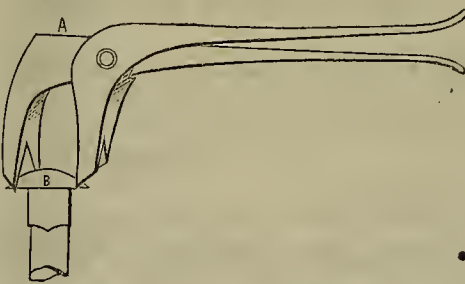
THE BALDWIN LOCOMOTIVE.

blue color in the transmitted light; the nearest approach to it being greenish-blue. Hence it appears, that in a general way, my experiments confirm the opinion that pure water absorbs to a somewhat greater extent the solar rays constituting the red end of the spectrum; while at the same time, they seem to indicate—in accordance with the deductions of Wild—that the absorption is more active at elevated temperatures. It must be born in mind, that these results relate to the tints of the transmitted light.

#### The Baldwin Locomotives.

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#### Legislative.

The Legislature is still working away making laws and listening to the reading of bills. The following business specially interesting to our readers has been transacted:

Lans' bill to declare hydraulic mining a felony was refused a first reading. The vote was 67 nays and 6 ayes. The author of this bill occupied considerable time for the purpose of denying that he was insincere in desiring the passage of the bill. Camron, the Chairman of the Agricultural Committee, said that he was glad the bill had not come from an anti-debris man because it had been said, both on the floor of the House and outside, that the advocates for repeal were trying to cut off hydraulic mining. The fact was that not one of the anti-debris men were opposed to hydraulic mining; the attack came from the other side. Murphy of San Luis Obispo took the same view, and declared the Lans Hydraulic Mining Felony bill a weak and feeble subterfuge of the debris men to prevent the repeal of the Debris act.

Jackson has introduced a bill to compel the use of a brand, stamp, stencil or trade-mark on all manufactured commodities.

Langford's bill concerning debris from hydraulic mines makes it a misdemeanor to run or

deposit such debris on agricultural land, and provides a further remedy by injunction against such acts.

Gilmore's stock gambling bill provides that a Mining Commissioner shall be appointed by the Governor. Weekly reports of the explorations in each mine must be filed with the Commissioner, with a statement of assays, tons of ore extracted, and, in fact, a history of everything that happens in the mine. If in the interval between weekly reports any strike of ore shall be made, or any fire or flooding happen, it shall be reported at once. A monthly report shall be made by each corporation, showing the condition of the business and the history of the mine for the previous month. Quarterly estimates of the amount of money which would probably be required for the working of the mine for the coming quarter shall be filed. If additional capital be required for working the mine, the fact shall be reported to the Commissioner. Annual reports, accompanied by a map showing the condition of the mine, shall be filed.

Barney's bill is to encourage the Assessors of

datory of an act entitled an act for the better protection of the stockholders in corporations formed under the laws of the State of California for the purpose of carrying on and conducting the business of mining.

Mr. Frasier's bill introduced last week is to pay James W. Marshall \$50 per month for two years (or less, if he dies), for services in discovery of gold, and "no further sum shall be due said Marshall, his assigns or legal representatives."

Mr. Neumann (by request) has introduced a bill about craft proficiency, in effect as follows: All persons pursuing a craft, trade or profession requiring special skill or knowledge to exhibit in place of work a certificate of the craft or trade society. All craftsmen and professional men within 60 days to organize a State or several societies, not exceeding one from each county, that are to examine fellow craftsmen as to competence and issue certificates certifying to competency, etc. Each society to make rules for its own government. All persons affected to comply within three months after formation of society, or be punished for a misdemeanor by fine of \$5 to \$50. Each society to have regulations looking to the detection and punishment of fraud, collusion or disreputable acts of its members. The act not to apply to those who have been three years engaged in any craft, trade or profession or service of the United States, and has a certificate to that effect.

Mr. McCallion wants to make incorporations pay the tax on their stock by amending the code, as follows: The capital stock and franchises of every corporation, association and joint stock company, organized under the laws of this State, shall be assessed to such corporation, association and joint stock company, and not to its stockholders. The value of such capital stock and franchise shall be ascertained by multiplying the market value of one of the shares of stock by the whole number thereof issued, deducting from the product the total assessed value of all other property, real and personal, assessed to it for purposes of taxation in this State and elsewhere. Each person, firm or corporation, owning or having in his or its possession any of the shares of the capital stock of any corporation, association, or joint stock company not organized under the laws of this State, shall be assessed therewith.

In the Senate on Tuesday, Sears' resolution, asking Congress to take charge of mining debris matters, came up and was discussed.

Cheney took the ground that the question should be made a National one at once, and the resolution he adopted.

Chase did not believe that the system adopted by the engineers would accomplish the results desired.

Watson was of the opinion that the resolution should be adopted without reference. He had faith in the system of brush dams, saying that not a foot of the dams had washed away.

Enos said if we endorsed the resolution, we would endorse all that the engineers had done.

The resolution was recommitted to the author for amendment. It was returned amended, and adopted almost unanimously.

McCallion has introduced a bill in effect as follows, concerning trade-marks: Manufacturers to use copy of brand, stamp or stencil or trademark with Secretary of State, designating name and location of person or corporation, manufacturing class of labor employed, and the original design in size adapted to the business. All articles and packages to be marked with such brand. Violation is a misdemeanor. Arrests to be made on sworn complaint, on information and belief.

#### A Handy Tool.

A correspondent of the *Blacksmith and Wheelwright* sends to that journal a drawing of a very handy tool for preventing bolts from turning. Many times, in taking old carriages apart, considerable trouble arises from the turning of bolts, as the small square under the head will not hold the bolt if the nut turns hard. In such cases it is usually necessary to split the nut to get the bolt out. The tool in question will save many bolts and much vexation of spirit. Set the jaws down over the head, B, of the bolt, strike on the top of the jaw at A with a hammer to settle into the wood; then pinch the handles and you will have it held fast, and the nut can then be readily turned off. The tool is about 10 inches long, and  $\frac{5}{8}$  to  $\frac{3}{4}$  of an inch in thickness, measuring through the points joined by the rivet. It will work on bolts from 3-16 to  $\frac{3}{4}$ , and even larger. A blacksmith can make a pair in one hour, and save many hours of valuable time. For the want of a better name we call it a "Polly."

MECHANICS' INSTITUTE LECTURES.—The Mechanics' Institute, of this city, has made arrangements for a course of lectures this winter, the first one of which will be delivered on Saturday evening, January 22d. Prof. W. B. Rising, the accomplished professor of chemistry at the University of California, is the lecturer. The rooms of the Institute are No. 27 Post street, between Montgomery and Kearny. Admission is free, and tickets may be obtained on application at the library. Prof. Rising will speak "On Chemistry," and will deliver six lectures altogether in the course. The doors are opened at 7:30 and lecture at 8 p. m. We hope to see a large and appreciative audience.

To ship ore to Salt Lake from the Wood river (Idaho) mines costs \$60 per ton.

Mr. Wasson's bill is to amend an act amend-



## Mining Debris.

[CONTINUED FROM PAGE 54.]

the flood-height is being raised every year, and the difficulty of guarding against disastrous inundations correspondingly increased, the stoppage of the hydraulic mines would neither remove this great evil nor abate it even for the moment in an appreciable degree. They say that the canyons of El Dorado, Placer, Nevada, Sierra, Yuba and Plumas counties are vast reservoirs of sand, which has been deposited in them by hydraulic mining operations during a period extending from 1854 to the present time. This sand—heavy quartz detritus—is, they state, coming down gradually but surely into the valleys. The river channels are already filled with it, and now the main body is being slowly pushed over into the valleys. But now it has passed the region where it could do no injury, and it is pressing forward. The engineers affirm that if this heavy sand is allowed to cover the valley lands,

Their Destruction will be Absolute. They say further, that even if the hydraulic mines are stopped it will continue to flow for years. They are confident that, though no complete cure for the damage already done can be obtained save through the healing hand of time, it is quite possible to prevent the further extension of direct damage, and to arrest completely the extension of indirect damage in the future. The large rivers, they hold, can be made better than they ever were, by proper treatment; but it must be systematic and continued. Whether, therefore, you acquiesce in the conclusions of the State and consulting engineers as to the merits of the particular methods which they recommend, or whether you conclude that some other plan would be preferable, I trust it may appear as clear to you as it does to me that the question is one which the State must undertake to deal with promptly, resolutely and intelligently.

I have endeavored to show you that I cannot regard the subject as one of merely local concernment, nor, indeed, do I think that a careful examination of it in all its bearings can lead any candid inquirer to a narrower conclusion. You are, in fact, called upon in this case to decide the fate of the Sacramento valley directly, and of very much wider interests indirectly. By this review of facts and inferences I have sought to bring clearly before your minds the magnitude of the problems

The Drainage Bill Presented when placed before the Executive for approval. To have arrested the experiments proposed by the bill would have deprived the people of the State of the right to apply an immediate remedy for the great evils complained of. To have done this without offering other plan or suggestion as to remedies from threatened disaster or succor from impending danger, would have been the assumption of a high responsibility. As representatives of the people the responsibility now rests with you, and with-out recommendation the whole subject is committed to you with confidence in your wisdom, faith in your willingness to give it due and just consideration, and hope in your ability to devise measures of relief which will meet adequately the requirements of the case.

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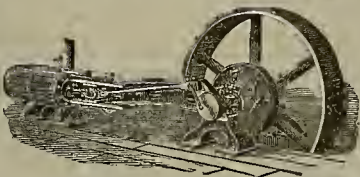
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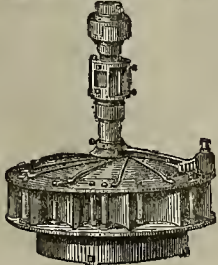
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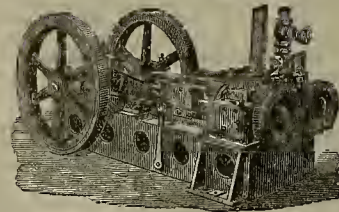
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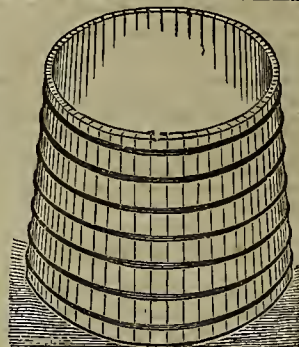
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## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**HAY PRESS.**—Thomas Phares, Eureka, Cal. Patented Jan., 1881. No. 236,253. This invention consists in the employment of a horizontal press, mounted upon low wheels and provided with means for attaching a team by which it may be drawn about the field, so that it may be filled with hay which has been previously raked into winnows, in combination with a horizontally moving follower, actuated by a peculiar double pawl and oscillating pawl hoard by means of a hand lever, so as to compress the hay after the press has been, filled and while traveling about. It also consists in a rear gate with a self-acting latch to release the hale after it has been tied. The pawls are lifted and held out of contact with the ratchet bar, while the follower is retracted to allow the press to be filled again.

**REFINING APPARATUS FOR SPIRITS.**—Pierres Perey, S. F. Patented Jan. 4, 1881. No. 236,251. This device relates to an improved refining apparatus, which is especially designed for the preparation of alcohol or proof-spirits, and for making brandy; and it consists in an exterior case or vessel which is adapted to receive the vapors from the still, or kettle, through a pipe in its bottom, whence they pass through a series of pipes which are surrounded with a body of water, and are deprived of their fusibility by being discharged into inverted bells, or caps, at the tops of the pipes. From these caps the remaining vapor passes upward through a dome, and out at the sides of another inverted bell-shaped top larger in diameter, whence the vapor of the alcohol, or brandy, escapes through a pipe at the top to be led to the condensing worm.

**REFLECTOR FOR SPIRIT LEVELS.**—W. W. Vaughn, Stockton, Cal. Patented Jan. 4, 1881. No. 236,252. This device consists in the combination with a level, having the tubes of this level and plumb placed midway between the sides and opening, equally to both sides of a reflector which is pivoted or journaled above the tube, so that the angle of the reflector may be changed from one side to the other, and thrown outward to any desired degree. It farther consists in partially enveloping or coating the bubble tube with a metallic reflecting surface, whereby the image of the bubble in the reflector will be rendered more distinct.

**WINDMILL.**—W. O. Swinnerton and E. B. Saunders, San Jose, Cal. No. 236,277. Patented January 4, 1881. This invention consists in constructing windmills having a tube extending upward between, and supported by converging frame posts, in combination with a frame, the lower bar of which surrounds the tube, while the upper bar is provided with a haring plate, which rests upon and is steadied by the tube.

## Academy of Sciences.

The regular meeting of the Academy of Sciences was held on Monday evening last. Joseph G. Eastland and Adolph Sutro were elected life members, and Henry E. Mathews was chosen a resident member. Among the donations to the museum, Mr. Lemmon donated a choice collection of rare ferns collected in Arizona, which have been neatly pressed and classified with great care. The Western Fur Company presented a gigantic pair of mounted antlers with the head attached. Captain R. W. Simpson presented specimens of water-rice found in Canada, upon which the canvas-back ducks often feed. W. N. Lockington presented 18 jars of new fishes, yet unclassified. Among other donations to the museum Mr. C. D. Voy presented a reduced fac simile, cast in terra cotta, of the same Aztec calendar stone which was dug up in the Plaza Mayor, city of Mexico, the ancient Aztec capital, where the great Tecalli is supposed to have stood, and where, with the sacrificial stone and the image called Teoyamiqui, they were doubtless thrown down and buried at the time of the conquest. Mr. A. W. Jackson, instructor in mineralogy and geology at the State University, read an interesting and scholarly paper on the "Occurrence of Precious Metals in Sedimentary Deposits." W. N. Lockington read a paper on "Pacific Coast Fishes" describing a number of non-edible varieties. Other papers which were prepared were left over. A letter was received from Dr. Schroeder, of Frankfurt-on-the-Main, claiming to be able to make a 50-inch refractor glass for telescopes by a new method cheaper than a 36-inch glass can ordinarily be made.

**THE DODGE CONCENTRATOR.**—Mr. M. B. Dodge has received the following from the Live Oak M. & M. Co., Hornitos, Mariposa county, Cal.: "The two concentrators we bought from you a short time since have been tested at our mill, and are satisfactory, requiring but little attention and using a small amount of water, and delivering the sulphurates very clean. The power used to drive them is very light indeed, and we believe them to be the best concentrators now in market."

## The Lick Telescope.

Some active steps are being at last taken in the direction of the Lick telescope, which is to be put up on Mt. Hamilton. This firm of Alvan Clark & Sons, of Cambridgeport, Mass., have contracted with Richard S. Floyd, William Sherman, Edwin B. Mastick, Charles M. Plum and George Schoswald, Trustees of the Lick estate, for the construction, for the Mt. Hamilton observatory of San Jose, of an achromatic astronomical object glass with 36 inches clear aperture, to be completed before November 1st, 1883. The sum of \$12,000 was paid at the time of signing the contract, and the further sum of \$38,000 will be paid upon the completion of the work. The terms of the contract are substantially as follows: The firm agree to make, figure, complete and deliver at their workshop the said object glass; the duties, if any, shall be paid by the Trustees; the definition of the glass shall not be inferior to that of the telescopes constructed for the United States Naval observatory in Washington; the glass shall be figured perfectly for one position, to be designated by the Trustees, and work well 20° on either side thereof; the Trustees shall give to the objective such focal length between 50 and 60 ft., as they may determine to be best; they may also designate what two rays shall be brought to one focus by the combined action of the lenses; the firm agree to procure satisfactory discs, if not, this contract to be void; the objective shall be perfected within two years after satisfactory rough discs are obtained by the firm, who shall also construct a rough, reversible, equatorial mounting for the objective, including a suitable tube; the objective, upon completion, shall be inspected by an expert agent appointed by the Trustees, but the firm, if dissatisfied with his decision, may have recourse to arbitration; the Trustees shall pay the firm the cost of the rough mounting for the objective to an amount not exceeding \$1,000, the mounting to continue the property of the firm; if, within five years after the acceptance of the objective, either of the glasses shall be found to have so deteriorated in figure as to injure its performance the firm, if alive and in sufficient health, or either of them, shall proceed to California and correct such defect, the necessary expenses of the trip, and the firm's subsistence while here, being paid in advance by the Trustees.

## Bullion Shipments.

Under this heading we give all shipments since our last issue. We will be glad to receive further reports:

Northern Belle, Jan. 10th, \$7,726.37; Standard, Jan. 10th, \$34,945.62; Con. Virginia, Jan. 15th, \$56,794; Ontario, Jan. 19th, \$9,874; Ontario, Jan. 11th, \$4,969; Ontario, Jan. 16th, \$10,448; Germania, Jan. 14th, \$15,450; Stormont, Jan. 14th, \$5,500; Christy, Jan. 13th, \$2,117; Barhee & Walker, Jan. 12th, \$1,950; Christy, Jan. 14th, \$2,095.

**ACCIDENT TO THE STATE MINERALOGIST.**—Mr. Henry G. Hanke, Chief of the California State Mining Bureau, met with an accident last week which came near being serious. Mr. Hanke left the city some days ago, accompanied by F. G. Smith of Nevada, bound for the mud volcanoes in San Diego county, about five miles from Volcano station, on the Southern Pacific railroad. The region is little visited, and the trains rarely stop at this point, but through the kindness of Mr. Towne they were supplied with letters ordering the train men to allow them to get off at any point on the road, and also to supply them with red lights and torpedoes for stopping the train when they wished to return. They made the fatiguing journey from the station to the volcanoes with moderate ease; but after making preliminary observations Mr. Smith went off to visit an attractive point half a mile away, leaving Mr. Hanke alone with the Chinaman who accompanied them in the capacity of servant. Mr. Hanke began the actual work, measurement of distances, etc., and was just stooping over to take the temperature of a boiling pond when he felt the mud crust give away beneath his feet, exactly as a thin sheet of ice yields to the pressure of a heavy body. Realizing his danger, he threw himself over backwards to escape, but his left foot sank through the crust and the boiling fluid overflowed ankle and foot, settling in the top of the shoe. His foot and ankle are badly scalded. He was brought back to the city and will be confined to the house for a few days.

**MR. LACY**, of the firm of Parke & Lacy, in this city, has been for three months past in the Eastern States, and while there has added largely to the stock of goods, machinery, etc., of the house. They have secured the agency of the celebrated wood-working machinery from the H. B. Smith Machine Works. Also for Hazard's steel ropes and cables, that are claimed to be superior to any make in the world. Parke & Lacy's stock is now one of the largest and most complete in the way of modern machinery on this coast, and is constantly being added to.

ANYONE who has a good second-hand 40-horse power engine and boiler for sale may find a purchaser by consulting our advertising columns.

## News in Brief.

THEY are having snow in Paris. Last year 116 vessels entered the Puget Sound district.

DEER skins sell in Jacksonville, Or., at 45 cents per lb.

THERE are 3,296 more males than females in Sonoma county.

LAST year Montana shipped 25,000 lbs. of deer-skins and furs.

TWELVE persons were killed by the snow slides at Alta, Utah.

HARRIET BEECHER STOWE'S "Uncle Tom" is lecturing in Chicago.

A SERIOUS riot occurred at Wigan, England, among the striking coal miners.

FORTY-EIGHT THOUSAND salmon was the catch from Rogue river for the cannery last season.

JUSTICE SWAYNE has informed his associates that he will resign and go on the retired list, shortly.

THE pacification of Cuba is now complete, according to an announcement made in the Spanish Deputies.

THE miners of Globe, Arizona, have organized an association to establish a mining bureau in Tucson.

IT is rumored the British troops made two sorties from Petro and were both times repulsed by the Bosre.

THEY are having very severe storms along the English coast. The weather is the worst experienced in 20 years.

SUPPLEMENTARY municipal elections in France, as far as known, generally results in the success of the Moderate Republicans.

THE Naval Appropriation bill has been agreed to by the committee. It appropriates \$14,461,037, an increase over last year of \$55,000.

HOWES' bill to provide for ex-Presidents, proposes to pay them annually one quarter of the amount of salary paid while in office.

SEVERAL deaths from scarlet fever have occurred in Dallas, Or., and the disease has been so sudden in its spread that a panic has ensued.

AT Yreka, during this recent storm, over 10 inches of rain fell in 70 hours, and great damage was caused by high water in that region.

A COLLISION between a ship and steamer off the English coast resulted in the sinking of the former and the drowning of 9 persons.

THE Nevada Legislature has passed a bill allowing gambling up stairs or down in cities with a voting population of less than 2,000.

THE Hussars have moved into the district in Lancashire, where the coal miners are on a strike, in order to be in readiness in any emergency.

THERE is only a stretch of 30 miles of staging now between the terminus of the Southern Pacific and Atchison, Topeka and Santa Fe railways.

THE stages between the termini of the Southern Pacific railroad and the Atchison, Topeka and Santa Fe railroad now run under military escort.

THREE temples are being built in Utah by the Mormons—one at Salt Lake, one at Logan and one at Manti. Their costs will aggregate many millions.

THE distress in county Clare is worse than last year. The Lord Lieutenant has ordered a presentment to the Court of Sessions for the organization of relief works.

THE sum of 50,000 marks has been subscribed toward founding an anti-Jewish newspaper, the majority of the Berlin journals being decidedly against the anti-Semitic movement.

A BAND of Indians, in the State of Chihuahua, Mexico, December 23d, killed four men, two women and a child, and afterwards murdered four shepherds and wounded several others.

IN Madrid, Spain, there has been terrible damage by the gales. Telegraphic and railroad communication is interrupted, steamers delayed, Castile mines flooded, and several wrecks are reported.

SECRETARY EVARTS reveals the fact that Blaine will be the next Secretary of State, by the statement made in diplomatic documents that Blaine will carry on the correspondence hereafter.

ABOUT 1,900 New York piano and furniture makers and carvers are on a strike, in consequence of a decision of the employers to reduce wages and make the day's work ten, instead of eight hours.

THERE has been in circulation during the last week at Washington, Alameda county, a petition to the Legislature for a "Local Option" law. A large number of signers were obtained. The movement was initiated by the Grand Lodge of Good Templars.

IN Anaheim and other places the citizens are signing petitions to congress to revoke the act granting to the railroad company the lands in the Mussel Slough district. The requests are based upon the claim that the company has failed to comply with the terms of the act.

ON the evening of the 14th a stage was attacked eight miles east of Fort Cummings by a band of 34 supposed Indians. The passengers were robbed, and it is reported that four of them were killed. The mail bags were carried off. United States troops are pursuing them. It is rumored that the robbers are disguised whites.

## Our Agents.

OUR READERS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send one but worthy men.

J. F. OSBORNE—San Francisco.  
A. C. KNOX—Pacific Coast.  
G. W. McGRATH—Santa Clara county.  
M. P. OWEN—Santa Cruz County.  
J. W. A. WHITT—Merced, Calaveras and Kern counties.  
N. E. BOYD—San Bernardino Co.  
JARRO C. HOAG—California.  
B. W. CROWELL—Colusa and Yolo counties.  
D. W. KALLERHER—Fresno, San Benito, Monterey and San Luis Obispo counties.

## Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

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FOR SALE BY ALL DEALERS.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

Wa overheard several commercial travelers a day or two ago eulogize the American Exchange Hotel, in this city, as furnishing one of the best tables on the Pacific coast. No higher compliment could be paid to Mr. Charles Montgomery, the proprietor, for commercial men see much of the world, and are the most competent critics.—Hotel Gazette, Jan. 7th.

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

## DIVIDEND NOTICE.

OFFICE OF THE

## Eureka Consolidated Mining Company.

Nevada Block, Room 37, San Francisco, January 15, 1881. At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 63), of Fifty (50) Cents per share was declared, payable on Thursday, January 25, 1881. Transfer books closed until the Twenty-first (21) instant.

P. JACOBUS, Sec'y pro tem.

## DIVIDEND NOTICE.

OFFICE OF THE

## Northern Belle Mill and Mining Company.

SAN FRANCISCO, JANUARY 10, 1881.

At a meeting of the Board of Directors of the above named company, held this day, Dividend No. Thirty-Nine (39), of Fifty (50) Cents per share, was declared payable on Saturday, January Fifteenth (15), 1881. Transfer books closed on Wednesday, January Twelfth (12), 1881, at 3 o'clock P. M.

WM. WILLIS, Sec'y.

Office—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

## DIVIDEND NOTICE.

OFFICE OF THE

## Western Mining Co. (Contention Mine.)

SAN FRANCISCO, JANUARY 8, 1880.

At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 8) of Seventy Five (75) Cents per share was declared, payable the Tenth (10) instant.

D. C. BATES, Sec'y.

Office—Room 79 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

## DIVIDEND NOTICE.

## The German Savings and Loan Society.

For the half year ending this date, the Board of Directors of The German Savings and Loan Society has declared a dividend on Term Deposits at the rate of five and two-fifths (5-2-5) per cent. per annum, and on Ordinary Deposits at the rate of four and one half (4-1-2) per cent. per annum, free from Federal Taxes, and payable on and after the fifteenth (15th) day of January, 1881. By order, GEORGE LETTIE, Sec'y. San Francisco, December 31, 1880.



## DIVIDEND NOTICE.

## San Francisco Savings Union,

532 California Street, corner Webb.

For the half year ending with thirty-first (31st) December 1880, a Dividend has been declared at the rate of five and two-fifths of one (1) per cent, (5 2-5) per annum on term deposits, and four and one-half (4 1/2) per cent, per annum on ordinary deposits, free of Federal tax, payable on and after Monday, seventeenth (17th) January, 1881.

LOVELL WHITE, Cashier.

## ANNUAL MEETING.

The Annual Meeting of the Stockholders of the REAL ESTATE AND BUILDING ASSOCIATES will be held at the office of the Company, No. 230 Montgomery Street, on Monday, the seventh (7) day of February, 1881, at twelve o'clock noon of said day.

LUIS F. EMILIO, Sec'y.

**Blue Bird Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Globe District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Eighth (8) day of January, 1881, an assessment, No. one (1), of Five (5) Cents per share was levied upon the capital stock of the corporation, payable immediately, in U. S. gold coin, to the Secretary, at the office of the Company, No. 10 Market Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Fourteenth (14) day of February, 1881, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Fourteenth (14) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

W. H. KNIGHT, Sec'y.

Office No. 10 Market Street, San Francisco, Cal.

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J. P. CHAPMAN.....Assistant Treasurer.

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The NEW BATTLE MOUNTAIN COPPER MINES, with Steam Engine and Boiler, Hoisting Machinery, with Boarding House, Office and Dwelling Houses, and a large Concentrating Mill and Ranges at Willow Creek, two miles from the mine, where there is a full supply of water for milling purposes. These mines have been in active operation for the past 12 years and have yielded large quantities of high percentage Copper ore. The mines at present are in regular course of working, and monthly shipments of high percentage ore are being made. The average assay of the ore for the past 18 months, has been 42 1/2% of Metallic Copper.

The Virgin Mine is sunk to the 600-ft. Level and is supplied with ample Pumping and Hoisting Machinery.

The Lake Superior Mine is sunk to the 135-ft. Level.

There is a large quantity of ore in the dumps at surface that can be profitably treated by Milling and Concentrating. The above mines are situated at Copper Canyon, 15 miles from Battle Mountain station, on the O. P. R. R., and 9 miles from the Nevada Central R. R., and are approached by excellent roads.

Further information respecting the property may be obtained of Messrs. HELLMANN BROS. & CO., Front St., San Francisco.

To inspect the property, and for full information thereon, application must be made to SAM'L G. TRURAN, the Superintendent at the mine, who will be open to receive offers for the same, until Monday, the 14th day of February, 1881.

The above property offers a rare opportunity for parties desirous of investing in copper mine.

As the Directors do not bind themselves to accept the highest or any offer.

## NEW BATTLE MOUNTAIN MINES,

Galena P. O., Battle Mountain, Lander County, Nevada.

SAM'L G. TRURAN, Superintendent.

January 11th, 1881.

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A NEW SERIAL STORY will be commenced in the next number of THE CALIFORNIAN which will run during the remainder of the year. It is entitled "'49 and '50," and is a story of early days upon this coast. The author is Mr. John Vance Cheney, whose articles in the leading Eastern magazines and in THE CALIFORNIAN have received such wide and merited recognition. Mr. Cheney has had this story in preparation for THE CALIFORNIAN for some time. Competent critics, to whom it has been submitted, pronounce it at once realistic and fascinating. The stirring events of 1849 and the succeeding year are vividly pictured. Absolute truthfulness of impression is sought rather than idealization. A thread of romance runs through the work, and the interest is sustained to the end.—(Note Book).

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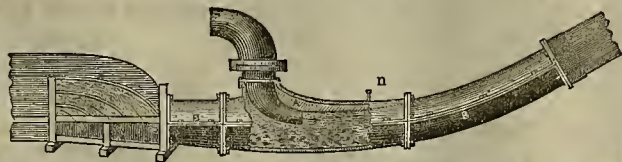
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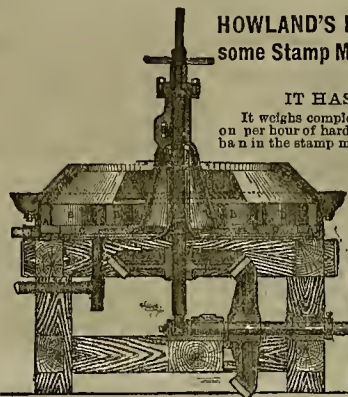
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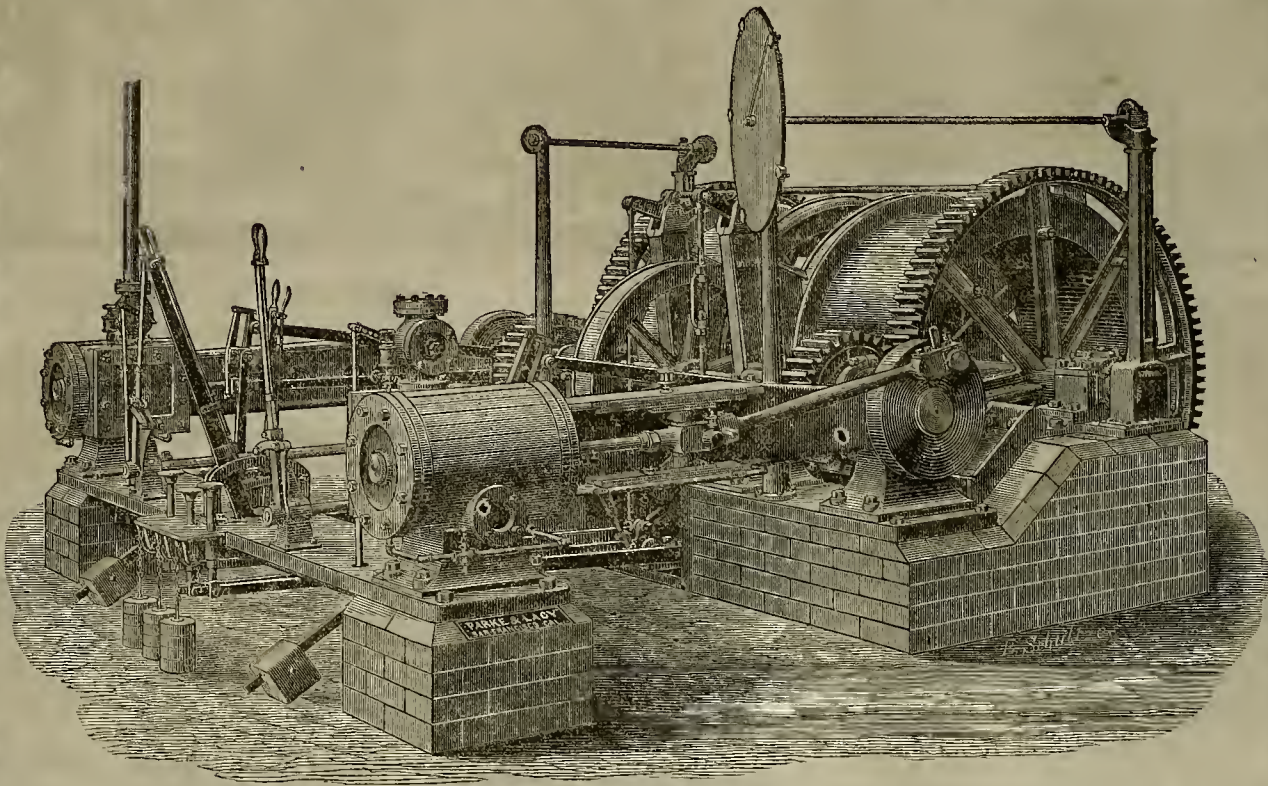


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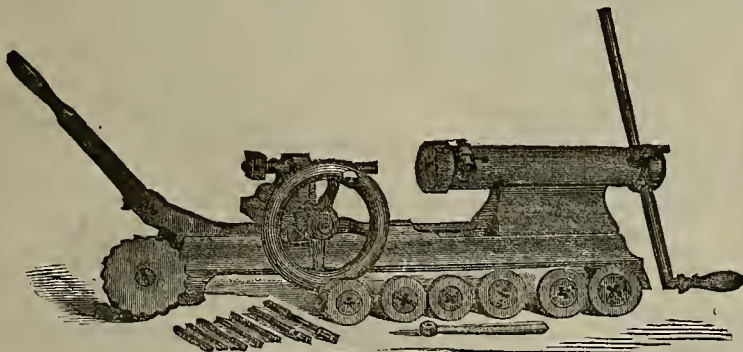
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JANUARY 29, 1881.

VOLUME XLII  
Number 5.

## The Viaduct of Garabit, France.

Among the railroads in France now in course of construction, we find one of particular interest, owing to engineering difficulties of a special kind, encountered at one point. The large plateau upon which this line is being built is intercepted by a deep ravine called the "Valley of Garabit." The preliminary line of the road had been run on the side of the hills bordering this valley, and to keep an easy grade to a possible crossing, was obliged to make a long circuit in sparsely settled localities, whence neither freight nor passengers would feed the road. After this long detour, the line would reach, on the sidehills of the other side of the valley, a point opposite the line before its deflection, and then assume the original direction across the plains again. The sidehills of this valley being of a schistose formation, and tolerably steep, the laying of the track would have proved very expensive and also difficult. In this dilemma, the administration of public works of France remembered that a certain

The angular beams are of a peculiar form, in the shape of the letter V, whose opening is turned toward the inside in order to admit the entrance of painter and engineer in his periodical inspection of the bridge. A spiral staircase is erected in the center of every pier.

We cannot give here the detail drawings of M. Eiffel's very interesting construction, but will simply say that the arch is in the form of a parabola of the second degree. The foundation for the piers are of stone supported by the bed-rock. It will be seen in the engraving that the key of the arch is 10 ft. in height. The rail is laid between two heavy timbers to prevent accidents.

The force of the wind in this construction has become one of the most important elements in the calculation of stability. The entire cost of the structure will be about 3,100,000 francs, including the very expensive masonry, and preparation of foundations in general.

There are few constructions we think, doing more honor to the engineering profession, than this viaduct of M. Eiffel, and the applause he received from the French society of civil engineers, when he submitted his plans before them, is fully merited.

It appears to us that similar structures to

## Legislative.

The Legislature is working away slowly, but does not appear to be accomplishing so much in the way of passing bills as in introducing them. A great many that are introduced are condemned by the committees as unconstitutional or otherwise defective.

A great deal of discussion is indulged in concerning the debris question. The investigation with regard to the expenditures on the brush dam is still in progress.

The bill introduced by Wasson, of Mono, "To encourage the legitimate mining interests of the State," appropriates \$10,000 for each of the years 1881 and 1882, to be devoted to the Mining Bureau Fund, established by an act passed last year. The money is to be diverted to the above purposes, and is to be paid out by the Board of Examiners.

Pardee has introduced a bill to reimburse the endowment fund of the University in the sum of \$79,000, that sum having been used by the State.

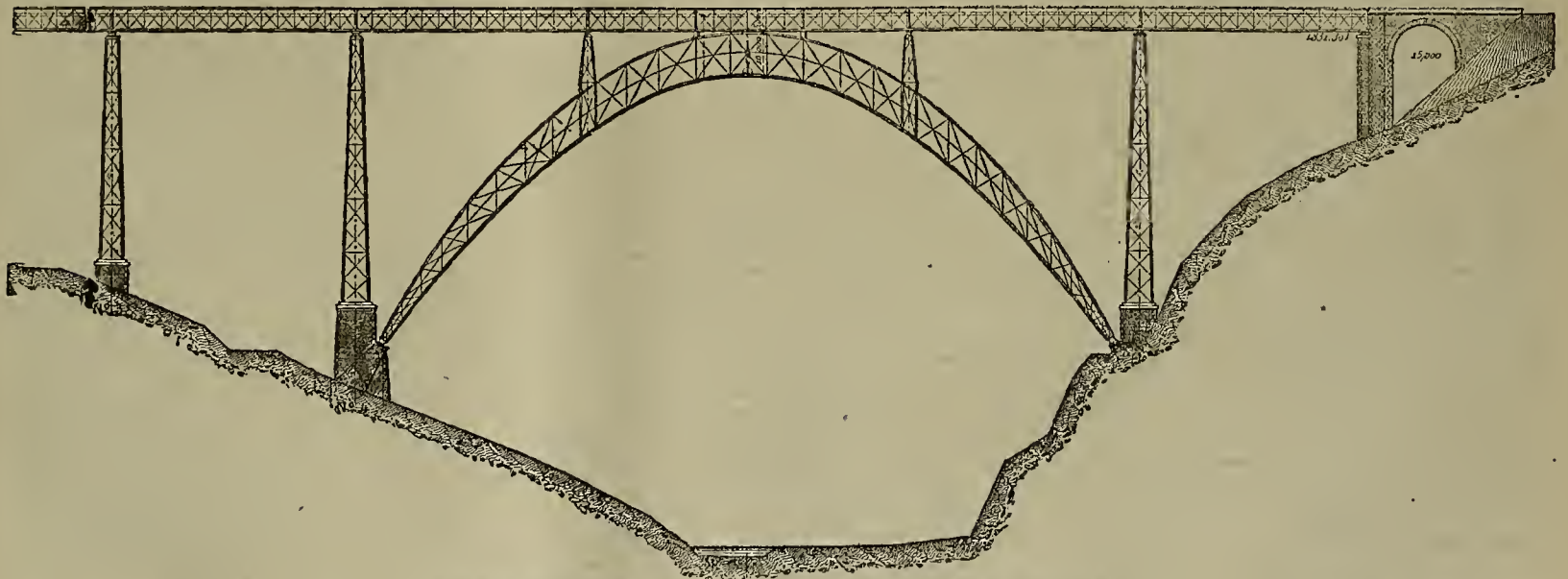
Senate bill No. 30, which excepts mining

sign, and in size adapted to the business of the person, firm or corporation claiming the same. Every person, etc., engaged in manufacturing shall mark, or cause to be marked, in a conspicuous place, each and every article, and each and every barrel, bale, box, cask, package, etc., containing articles manufactured by any such person, firm or corporation, with the brand, stamp, stencil, etc., of any such person, etc., manufacturing the same. It is also provided that no person shall sell, or expose for sale, any article that does not bear the brand or stamp. Any person not complying is guilty of a misdemeanor. Any person furnishing information concerning the violation of the act shall be entitled to half the fine imposed.

## Lieu Lands for Mineral Locations.

Assemblyman Kellogg, of Plumas and Lassen, has introduced the following concurrent resolution, which has received the approval of the Surveyor-General:

WHEREAS, The Supreme Court of the United States has required a judgment to the effect that the grant of lands of the 16th and 36th sections made to the State of California by an



EIFFEL'S PLAN FOR A RAILROAD BRIDGE AT GARABIT, FRANCE.

engineer, named Eiffel, had constructed a bridge at Douro, near Porto, of a height of 62 meters; that there was also in successful operation, the Frihourg viaduct, at an altitude of 78 meters; and the result of these reminiscences was to send for M. Eiffel, and to give him full charge of the project to span the Valley of Garabit with an iron viaduct intended to dispense with the long and profitless circuit to the head of the valley and back.

M. Eiffel went to work in good earnest; and while projecting the strains of his parabolic arch, discovered a possibility of raising arches a good deal higher than the previous height attained, and which were considered as the extreme altitude attainable with ample safety.

The calculations of M. Eiffel convinced him that roadways could be safely carried over metallic piers 100 meters high with a hatter of 10 centimeters to the meter and to contain all the guarantees of stability and security.

M. Eiffel solved the problem of carrying the railroad over the Valley of Garabit, on a level line with the plateaux on both sides, by proposing for construction an iron viaduct 448 meters in length with a peculiar central arch (see engraving) of 165 meters opening, and a middle ordinate (height of arch from spring line) of 65 meters. It will be seen that the vale is elevated 122 meters above the creek Trueyere. The larger piers have in the direction of the lateral thrust a breadth of 6.25 meters at the head, 20 meters breadth at their base, and the other way five meters at the head and 15 at the base.

these, could be profitably used elsewhere, particularly in rough and rugged mountainous regions as are met in California, Colorado and Nevada. One of these arches would span a deep wide canyon admirably, and obviate the necessity of piers being placed at points where their foundations were liable to injury from strong currents of water.

THE STATE ENGINEER'S MAP.—We learn from the report of the State Engineer, that parts of the new map of California, which is being drawn in his office, are approaching completion, and he recommends that it be published by the State as fast as completed, and sold at cost price for the public benefit. The suggestion seems to us an excellent one, for the maps now attainable are but partially correct. The new map will be on the scale of six miles to the inch, and will occupy a sheet about 10 ft. square. This would require a good-sized wall to hold it, but if it can be had in parts it would serve many valuable purposes.

QUITE an excitement sprung up at Buckeye, Butte county, last week. It seems that there was a piece of ground on Walker's plains that had not been taken up, and hearing that Mr. Alstrom, of Spanish Peak, intended to bring down a boring machine this coming summer to prospect the ground with, everybody rushed out to take up a claim. They surveyed the claims on top of the snow.

stocks from securities in which corporations may invest, and which restricts mortgages to first mortgages on real property worth 100 per cent. more than the loan, will be recommended for passage.

Gavigan has presented a petition from the students of the University praying for an observatory at the University.

Wasson, of Mono, of the Committee on Mines and Mining, recommended the passage of the bill to establish a State Hospital for indigent miners.

West introduced a concurrent resolution requesting our Congressmen to secure an appropriation of \$200,000 to continue improvements at Wilmington.

In the Assembly Lane's bill, making hydraulic mining a felony, was killed without a reading.

Fallon, of the Committee on Corporations, reported for passage Assembly bill No. 195, providing for the protection of stockholders of mining companies.

Gorman's bill, "to compel the use of a brand, stamp, stencil or trade-mark on all manufactured commodities," provides that each and every person, firm or corporation engaged in the manufacture of any commodity shall, within 20 days after the passage of this act, procure a brand, stamp, stencil or trade-mark, to be used as herein provided. It shall plainly designate the name and location of the person, firm or corporation claiming the same; the class of workmen employed, whether Caucasian or Mongolian. It shall be of original de-

act of Congress of date March 3, 1853, did not include any mineral land; and whereas, the State has offered such lands for sale, and has issued certificates of purchase for the same, and citizens have in many instances placed valuable improvements and expended large sums of money thereon; therefore he it

Resolved, By the Assembly, the Senate concurring, that the Senators and Representatives in Congress, of the United States, from the State of California, be, and they are hereby requested to use their efforts to secure the passage of a law that will, as far as possible, protect the rights of those persons having certificates of purchase therefrom from the State of California, and to indemnify them against loss, and also to allow the State of California to make other selections of land in lieu of such mineral land in such manner as is set forth in H. R. bill, 4,385, of the 46th Congress, second session.

This subject is of conspicuous interest to mining men, who have erected quartz mills and other improvements of value on the property referred to, and included in the above petition.

New hoisting works are to be erected at the Tintop (Arizona) mine. The 300 ft. level is yielding well, and the mill is crushing the usual quantity of ore. About 100 men are employed about the mine and mill.

The California mine produced 297 tons of ore last week, assaying \$19.46, and the Con. Virginia 495 tons, assaying \$21.79 per ton.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS

### Bisbee, Arizona.

EDITORS PRESS:—This point has become of considerable importance in Arizona developments. The greatest interest and most marked developments here are the copper workings.

The Copper Queen mine seems of itself a marvel. Excavations have been made on the hill-sides, and the ore simply quarried out. The deposit has been so extensive that as yet there has been no necessity to sink shafts for ore.

The ore is quarried at a point on the mountain-side, about 200 ft. above the level of the charging floor of the furnace, and is shot down a chute to the furnace ground. The works are smelting about 27 tons of ore per day, making block copper similar to Chile copper bars. The yield of copper is from six to six and a half tons per day. The ore as worked averages 25% net result.

The furnace is the "Water Jacket," made by Bisbee & Williams of San Francisco. All the works, including the furnace and ore development, are under the care of Williams Bros., and appear to be economically and carefully managed. Messrs. Martin & Ballard of San Francisco are the chief owners of the Copper Queen.

While the ore is still being quarried off from the hill-side, as mentioned, yet the company, or owners, in order to get some idea of the extent of the ore deposit, have drifted south into the hill 90 ft., all in ore, and have sunk a winze in the drift 50 ft., and all in ore. From the point where the drift is started it is 60 ft. from the surface, this distance having been gained by the work of quarrying for ore that has been worked. The ground thus worked is about 100 ft. in length by 80 in width; and there have been taken and smelted from this spot about 3,500 tons.

The copper bars are hauled by teams to the railroad at Benton, a distance of 60 miles, over good roads. The smelting is conducted by coke brought from San Francisco.

The Neptune company, which, I believe, is a corporation effected in New York, have copper mines near by, and are believed to be also of great value; but as yet the company has only been prospecting its property.

Feeling satisfied of the value of the mines it owns, the company proposes to erect furnaces of some magnitude on the San Pedro river, about 20 miles on the way from the mines to the railroad. It is understood that the company intend to erect furnaces there of sufficient capacity for all the copper ore the regions round about may produce.

Copper mines exist in the San Jose and Huachuca, as well as in the Mule mountains, but to what extent is of course yet unknown.

Bisbee a little, quiet, active town of a few hundred inhabitants, situated in Mule Pass canyon, several miles in the Mule mountain range. Not many months since only a few tents comprised the habitations here, while now there is quite a town appearance, and some good buildings. A two-story hotel building exists, and is well conducted by Mrs. Grimes of San Francisco.

There are silver mining prospects and a few gold claims in Mule mountains, many of which are promising; but as yet only little development has been made in these properties. But some good mines may be expected ere long from this section of Arizona. C. C.

### Physical Studies of Lake Tahoe.—No. 5.

(Written for the Press by PROF. JOHN LE CONTE.)

#### Has Pure Water any Color by Diffuse Reflection?

In relation to the colors observed in the deep waters of certain lakes and seas, it is evident that the transmitted light cannot reach the eye of the observer. Hence it is plain that if such waters were perfectly free from all foreign materials, in solution or mechanically suspended, there are only two methods by which colored tints can emanate from the interior of such a transparent liquid. These are for pure water: 1. Color tints by diffuse selective reflection from the aqueous molecules; 2. Color tints produced by selective absorption and the diffuse reflection of the unabsorbed light. In the first case the tints of pure water would be analogous to those of opalescent liquids. In the second case the hues would be analogous to those of weak colored solutions, in which the colors by transmission and reflection are the same. In both cases it is absolutely essential, in order that the color tints should reach the eye of the observer floating on the surface of deep waters, that the aqueous molecules should possess the property of reflection; the only difference being that in the first case the reflection is selective, while in the second case all the unextinguished rays are more or less reflected. So that the primary question which is to be settled is: Whether

perfectly pure water has any color by diffuse reflection of light from the interior of the liquid? This, being a question of fact, can only be settled by observation and experiment.

We have already seen that Sir I. Newton, and many of his successors, thought that water exercised a selective reflection on the rays of sunlight which traversed it. In proof of this he records an observation related to him by his distinguished contemporary and friend, Dr. Edmund Halley. Having descended under sea water many fathoms deep, in a diving bell, Halley found, in a clear sunshine day, a crimson color (like a damask rose) on the upper part of his hand, on which fell the solar rays after traversing the stratum of water above him and a glass aperture; whereas the water below him, and the under part of his hand illuminated by light coming from the water beneath, appeared green. From which Newton concluded that the sea water reflects the violet and blue rays most easily, and allows the red rays to pass most freely and copiously to great depths. Hence the direct light of the sun must appear red at all great depths, and the greater the depth the fuller and more intense must the red be; and at such depths as the violet rays scarcely reach, the blue, green and yellow rays, being reflected from below more copiously than the red ones, must make a green ("Newton's Optics," book 1, part II; prop. 10, exp. 17). At a later date, J. H. Hassenfratz verified Newton's explanation by means of a long tube blackened inside, closed at the ends by glass and filled with pure water, through which the solar rays were made to pass. The transmitted light became successively white, yellow, orange or red, as the length of the columns of water traversed was augmented. Annular diaphragms placed at different points in the tube appeared black on the side of the observer at the point where the transmitted light was white, a feeble violet where it was yellow, blue where it was orange, and green where it was red. The diaphragms being illuminated by the ray reflected from the interior portions of the water, the light presented a color complementary to that which was transmitted.\*

It is evident, therefore, that both Newton and Hassenfratz regarded pure water as possessing the properties of an opalescent medium. On the other hand, we have already shown that distilled water really absorbs the solar rays constituting the red end of the spectrum more copiously than those of the blue end, so that the transmitted light comes out greenish blue. The discrepancy thus indicated is doubtless due to the circumstance that in the older observations and experiments the water employed was not sufficiently free from mechanically suspended materials; for the presence of an extremely minute quantity of suspended matter in distilled water is sufficient to change the color of the transmitted solar light from greenish blue to yellow, orange, or red, according to the amount of foreign materials present. Thus, Tyndall found that when an alcoholic solution of mastic and other resins is added to water, a finely-divided precipitate is formed, which, when sufficiently diluted, gives the liquid a blue color by reflected light. Hence, he maintains "that if a beam of white light be sent through a liquid which contains extremely minute particles in a state of suspension, the short waves are more copiously reflected by such particles than the long ones. Blue, for example, is more copiously reflected than red. When a long tube is filled with clear water the color of the liquid (blue-green), as before stated, shows itself by transmitted light. The effect is very interesting when a solution of mastic is permitted to drop into such a tube, and the fine precipitate to diffuse itself in the water. The blue-green of the liquid is first neutralized, and a yellow color shows itself; on adding more of the solution, the color passes from yellow to orange and from orange to blood red." Again he says: "It is evident this change of color must necessarily exist, for the blue being partially withdrawn by more copious reflection, the transmitted light must partake more or less of the character of the complementary color" ("Glaciers of the Alps," "Colors of the Sky," edition cit. ante; p. 259-261).

My own experiments, by means of the series of glass tubes, already described, strikingly confirm the foregoing deductions. Indeed, I was unable to find any natural water however clear, which did not contain a sufficient amount of finely-divided particles in a state of suspension to impart the opaline characters to the transmitted solar light.

The purest hydrant water, as well as the water taken from the Pacific ocean, in lat. 39°, 17' north, and long. 123°, 58' west from Greenwich did not manifest the greenish-blue tint of distilled water by transmitted light, but exhibited colors of the emergent beam, which varied from yellowish-orange to green according to the amount of suspended matter present in the column of liquid. As early as 1857, Prof. Tyndall seems to have fully recognized the important function of finely divided suspended matter in imparting the blue tints to the light

\*The above account of Hassenfratz's experiments is taken from Daguin's "Traité de Physique," third edition, tome 4, article 2,056, p. 417; Paris, 1863. Not being able to find any reference to Hassenfratz's original paper, I wrote to Prof. P. A. Daguin, of Toulouse, and ascertained that the details given in his treatise were taken from the grand "Encyclopédie Méthodique," 1812; "Dictionnaire de Physique," word couleur, page 610. He further informs me that he has never seen the original memoir, and doubts whether it was ever published in extenso. The details given by Daguin are said, by him, to be scarcely less full than those given in the "Dictionnaire de Physique." I have not been able to find a copy of the "Encyclopédie Méthodique" on this coast.

reaching the eye by diffuse reflection from the interior of masses of water. This is distinctly indicated in the account of his experiments already quoted. Again, in speaking of the bluish appearance of thin milk he says, "Its blueness is not due to absorption, but to separation of the light by the particles suspended in the liquid." In reference to the blue color of the waters of the Lake of Geneva, on the 9th of July, 1857, he remarks, "It may be that the lake simply exhibits this color of pure water" ("Glaciers of the Alps," edition cit. ante, pp. 33-34). But a little later, and after making the experiments previously noted, he very significantly asks, "Is it not probable that this action of finely-divided matter may have some influence on the color of some of the Swiss lakes—on that of Geneva, for example?" Again, in speaking of the color of the water of this lake, he says, "It seems certainly worthy of examination whether such particles suspended in the water do not contribute to the production of that magnificent blue, which has excited the admiration of all who have seen it under favorable conditions" (Op. cit. supra, p. 261). Nevertheless, it is quite evident that at this time Prof. Tyndall regarded the suspended particles as playing a comparatively secondary part in the production of the blue tints of the natural waters; for he clearly intimates that pure water has an inherently blue color in the same sense as a weak solution of indigo. It was not until 12 years later that the beautiful experimental investigations of Prof. Tyndall in January, 1869, in relation to the blue color of the sky, the polarization of sky light, and on the polarization of light by cloudy matter generally ("Proceedings of Royal Society," vol. 17, No. 103, pp. 223-233, Jan. 14, 1869), first suggested to J. L. Soret, of Geneva, the analogy which exists, in regard to polarization, between the light of the sky and the blue light coming from the water of the Lake of Geneva. In a letter addressed to Prof. Tyndall, dated Geneva, March, 31, 1869, M. Soret maintains that blue color of the water of this lake is due exclusively to the suspended solid particles, from the fact, which he establishes by direct experiments, that this light presents phenomena of polarization identical with those of the light of the sky. For his experiments show: 1st, that the plane of polarization is coincident with the plane of incidence; and 2d, that the polarization is a maximum when the light received by the eye is emitted at right angles to the direction of the refracted solar rays in the water (Phil. Mag., 4th series, vol. 57, p. 345, May, 1869). Also "Comptes Rendus," tome 68, p. 911, April 19, 1869. Also "Archives des Sci. Phys. et Nat.," tome 35, p. 64, May, 1869.)

During the year 1869, and soon after the publication of these investigations of the Swiss physicist, Alex. Lallemand made a number of interesting communications to the French Academy of Sciences on the "Illumination of Transparent Bodies," in which he attempted to controvert the deduction of Soret, and attributed the diffuse illumination of such media—as well as the peculiar phenomena of polarization above noticed—to the action of the molecules of water, and not to the presence of foreign corpuscles in suspension. The French physicist bases his conclusions mainly upon the phenomena manifested in transmitting beams of solar light through clear glass and distilled water, which he assumed to be optically homogeneous media. (For full text of Lallemand's memoirs vide "Ann. de Chim. et de Phys.," 4th series, tome 22, pp. 200-234, February, 1871; and "Ann. de Chim. et de Phys.," 5th series, tome 8, pp. 93-136, May, 1876.) But the views of Soret were very soon abundantly verified by additional and more refined experimental researches, by which it was proved that under the searching test of a concentrated beam of light traversing such media in a darkened room, none of them manifested anything approaching to absolute homogeneity in relation to light. Under the hypothesis that the illumination of such bodies is due exclusively to the presence of foreign corpuscles suspended in them, it is evident that the more a non-fluorescent liquid (as water) is deprived of heterogeneous particles, the less must be its power of diffuse illumination; and, if we could secure a complete elimination of the particles in suspension, a concentrated luminous beam would produce no laterally visible trace in traversing the liquid. Accordingly, in relation to water, the experiments of Soret, in January and February, 1870, show that the most careful distillation does not entirely remove the suspended matter; although, in proportion to the care with which the distillation was made, the less was the light scattered in traversing the liquid. Moreover, he found that the scattering power of the waters of the Lake of Geneva was diminished by allowing the liquid to repose long enough (many months) to permit the suspended matter to partially subside. Conversely, the experiments of the same physicist prove conclusively that when the number of particles in suspension is augmented—provided they are sufficiently attenuated—the power of illumination in the water was considerably increased without modifying the phenomena of polarization. Thus, it was found, that very diluted precipitates formed in distilled water, gave rise to considerable augmentation in the power of diffuse illumination, and the light emitted transversely to the traversing luminous beam, presented the same characters of polarization as have been previously indicated. For example, a flask filled with water from the Lake of Geneva, which, after long repose, manifested a very feeble power of illumination, when a drop of a

solution of nitrates of silver was introduced, the presence of a trace of some of the chlorides gave rise to a delicate precipitate which was invisible in diffused light; but in a darkened room it exhibited a notable augmentation in the brightness of the trace produced by the passage of a concentrated beam of solar light, and the phenomena of polarization were complete. The addition of a second drop of the solution of nitrate of silver augmented this power of illumination, the trace of the beam appeared distinctly blue, and the polarization became more complete. ("Archives des Sci. Phys. et Nat.," tome 37, pp. 146-155, February, 1870.)

In like manner the experiments of Tyndall, in October, 1870, prove that while, as a general fact, the concentrated beam of light may be readily tracked through masses of the purest ice when made to traverse them in various directions, yet, there were remarkable variations in the intensity of the scattered light; and in some places the "track of the beam wholly disappears." In relation to water, Tyndall was also unsuccessful in entirely removing the suspended particles by the most careful and repeated distillations. His experiments on water taken from the Lake of Geneva and from the Mediterranean sea, off the coast of Nice, show that the concentrated beam of light traversing each of them manifested a distinct blue color when viewed laterally. "Viewed through a Nicol's prism the light was found polarized, and the polarization along the perpendicular to the illuminating beam was a maximum." He adds: "In no respect could I discover that the blue of the water was different from that of the firmament." (Nature, vol. 2, pp. 489-490, October 20, 1870.)

Prof. Ed. Hagenbach confirmed Soret's views in relation to the polarization of the blue light emanating from the waters of lakes, by a series of observations on the Lake of Lucerne.

Without contesting the fact that the polarization of the diffused light emitted from such waters is produced by reflection from minute particles held in suspension; he, nevertheless, suggests that a certain want of homogeneity, due to differences of temperature in the layers of water, might likewise give rise to similar phenomena of polarization. But Soret has shown, by direct experiments, that it is not possible to attribute the illumination and polarization to the reflections from the layers of water of unequal density; moreover, even if these reflections contribute something, in certain cases, to the production of the phenomena, it is evident, that under ordinary circumstances, their influence must be insignificant. ("Archives des Sci. Phys. et de Nat.," tome 37, pp. 186-181, Feb. 1870.) In the light of the results afforded by the preceding experimental investigations, we are now prepared to give a definite and intelligible answer to the question, "whether perfectly pure water has any color by diffuse reflection of light from the interior of the liquid?" It seems to me, that the evidence leading to a negative answer to the foregoing question is overwhelming.

Prof. Tyndall's conclusion, in relation to this point, appears to be a perfectly legitimate induction from the ascertained facts. In speaking of the water obtained from the fusion of selected specimens of ice, in which extraordinary precautions were taken for excluding impurities and which were regarded as the purest samples of the liquid hitherto attained, this sagacious physicist remarks: "Still I should hesitate to call the water absolutely pure. When the concentrated beam is sent through it the track of the beam is not invisible, but of most exquisitely delicate blue. This blue is purer than that of the sky, so that the matter which produces it must be finer than that of the sky. It may, and indeed has been contended that this blue is scattered by the very molecules of the water and not by the matter suspended in it. But when we remember that this perfection of blue is approached gradually through stages of less perfect blue, and when we consider that a blue in all respects similar is demonstrably obtained from particles mechanically suspended, we should hesitate, I think, to conclude that we have arrived here at the last stage of purification. The evidence, I think, points distinctly to the conclusion that could we push the process of purification still further, even this last delicate trace of blue would disappear." (Fragments of Science: "Duet and Disease," pp. 319-322, Am. Ed., N.Y., 1875). In other terms, "water optically homogeneous would have transmitted the beam without revealing the track." "In each water the course of light would be no more seen than in optically pure air." Hence the scattering of the light is not molecular, but is evidently due to the presence of finely divided matter in a state of suspension, whereby the shorter rays of the beam are intercepted and diffused more copiously than the longer ones, thus rendering the trace of the light visible in the liquid and imparting a blue tint to the laterally scattered polarized light. The conclusion seems therefore to be inevitable that, if water were perfectly free from all foreign materials, either in solution or chemically suspended—both chemically and optically pure—it would have no color at all by diffusion of light; in fact, inasmuch as no scattered light would be emitted from the traversing beam, it would show the darkness of true transparency.†

†The presence of colorless salts in solution does not seem to impair the transparency of water or to have any influence on the phenomena of coloration by scattered light. As previously intimated, there is no improbability in the supposition that the existence of certain salts in solution might augment its transparency.



## MECHANICAL PROGRESS.

## Improvements in Metal Working.

The progressive history of the use of machine tools—tools driven by power—in the manufacture of metallic articles is a comparatively brief one, comprehended, or nearly so, in the memory of some of our oldest mechanics. There are men now living who remember the advent of the power planer and the screw cutting engine lathe, and many of the commonest tools now employed in the machine shop were introduced since our middle-aged men were boys. There is no department of useful industry that has made such strides within 30 years as that pertaining to the shaping and finishing of metals.

Thirty or forty years ago the machine tools of a machine shop could be classed under three heads, lathes, planers and upright drills. And the lathes and planers and drills had but a remote family resemblance to those of the present time. There were no special tools, and even the milling machine, now in so general use, was merely suggested by the crude "elabher." Indeed, there were few shops that possessed an iron planer, and the cold chisel and hammer were in use for the dressing and truing of all plane surfaces. Some very neat jobs were made, however, by means of these crude tools and the after finish of the file. There were, however, attempts at hand planing of iron by means of a plane block and a chisel cutter.

Some of the work done at this time, and with the aid of these rudimentary tools, was of excellent character. It is but a few weeks ago since the writer came unexpectedly on a lathe in use that was built in 1834. The frame was of Southern pine—two parallel planks, some sixteen inches wide and six inches thick, set on edge and bolted through crosspieces and legs. The V-way for head and tail stocks and carriage were of iron, cast in lengths of about three ft., seated in channels plowed into the upper edge of the plank and secured by wood screws. This represented the ordinary lathe of 50 years ago. It will do, even now, a fair job of straight turning.

The first iron planer, of the writer's recollection, was exhibited about 45 years ago in what was then considered a first-class shop. The entire frame, cross-head and all, was of timber. The ways and platen were of iron, and the platen was moved by the alternate winding and unwinding of a log chain at either end of the machine. Of course there was much backlash, and the progress of the work was conspicuous for its jerky, halting motion. To this machine succeeded, in time, nearer approaches to the present planer; a screw feed superseded the chain feed, and has since given place to the cut-rack and pinion feed.

The single spindle upright drill never seemed to suggest the advantage of two or more spindles in the same machine, and even the single spindle drill was used for only the commonest work and the roughest jobs.

Is it possible to conceive of a machine shop thus rigged out at this day? And yet this is a fair picture of what a machine shop was at the end of the first quarter of the present century. The workman of that day was as valuable for his fertility of resource and handiness of contrivance as for his skill in the use of tools and his perfection of workmanship. As compared with the old time shop the modern shop is as a palace to a hovel, or a fine city to an insignificant hamlet. So many are the appliances general and special, for reaching any job and performing the work in the best possible way, that an old-fashioned machinist would feel what the French call an embarrassment of riches, in given his choice of means in such a shop. And yet it would be difficult to show a single instance in which a tool, implement, attachment, or contrivance, even of a special character, is useless or wasted. The saving of minute portions of time in the handling of work, amounting to a mere trifle calculated by one man and a single day, is deemed of importance enough, when multiplied by many workmen and a year's time, to justify the expenditure of thousands of dollars in the production of special appliances.

These improvements are going on now as rapidly as at any period. There is scarcely a single tool making establishment but has now and is constantly receiving orders for special work, much of which is entirely novel and original.—*Boston Journal of Commerce.*

**TO POLISH ALUMINIUM.**—M. Mouray recommends the use of an emulsion of equal parts of rum and olive oil, made by shaking these liquids together in a bottle. When the polishing stone is used the peculiar black streaks first appearing should not cause vexation, since they do not injure the metal in the least, and may be removed with a woolen rag. The object in question may also be brightened in potash lye, in which case, however, care must be taken not to make use of too strong a lye. For cleaning purposes, benzole has been found best. Objects of aluminium can be electroplated without the least difficulty, and Mouray succeeded in imparting to them a bright white luster in passing them successively through a weak bath of hydrofluoric acid and aqua fortis. The effect thus obtained is said to be quite surprising.

## Lathe Saws.

The diminutive circular saws so often used in the lathe for slotting and cutting off should be more extensively employed than they are, and they probably would be only for the difficulty of tempering them without springing. It is scarcely to be expected that verbal directions, alone, can remove this difficulty, but it can be removed by practice. There is a "knack" of tempering, which although not at all mysterious, is very difficult to impart to another. As a retired machinist said, a few weeks ago, he had never succeeded in teaching his method of tempering springs, a department of work in which he was an adept, and he left his successor quite depressed because he could not catch the trick. But after a few failures the trick was found, and the new man rivaled the old hand in spring tempering.

Saws should be cut or punched out of sheet or plate steel, not forged and faced up in the lathe. Let the thickness or gauge of the steel determine the thickness of the saw; for differing thicknesses of saw select differing gauges of steel. It is better, after drilling, to turn several saws at once and cut the teeth of several at the same time, than to work on a single saw. The arbor ought to be of steel and not less than 10 inches long; large enough to turn up at the end for the reception of the saw and leave a generous shoulder. The saw should be secured against this shoulder by a nut threaded on the arbor. A small check-pin is not objectionable. No turning, grinding or other finishing should be permitted on the sides of the saw; leave the old scale as the steel plate came from the rollers.

To harden and temper, fix the saw by its hole to a bar or rod, as though it was an arbor. Heat evenly over a charcoal fire to a good cherry red. Dip it evenly in a horizontal—level—position into a bath of whale or lard oil, moving it horizontally until it is cool. Remove it and with the oil on it heat it over the fire until the oil flashes or flits over the surface. Do not allow the oil to burn. In some cases this after drawing is not required, and for work in very hard metals, water hardening and color drawing may be necessary. But in all cases the saw must be hardened horizontally, not vertically.—*Boston Journal of Commerce.*

## The Locomotive a Precedent for Higher Piston Speed.

Advocates of high piston speed, just now attracting some discussion and exchange of opinions, have a strong argument on their side in the locomotive as built and operated to-day. Certainly, no more prominent instance could be cited in favor of the system. Here is a machine, that depends upon high speeds of piston for its success, and is worked under more adverse and destructive conditions than a stationary engine is ever liable to, yet it undergoes no extraordinary wear and tear while exerting far greater power in the same space of time than the stationary engine. As regards mechanical construction, the locomotive engine displays the most advanced knowledge of the day, in the fitting up of parts, in proportion of bearing and wearing surfaces, and in working steam expansively, as far as the link motion is capable, while in mere endurance of shock and strain of varying loads, handled by different persons of more or less mechanical knowledge, it suffers more in a year than a stationary engine in a lifetime.

No other tools than those already in daily use are required; no mechanics, other than those already trained, need training, so that, if we are to build high speed stationary engines instead of low speed, the necessary appliances and precedents exist. In connection with this subject, and as a practical example of the truth of the statements above, engine 273 on the Pennsylvania railway may be cited. This engine was built in 1875, has 5-foot drivers, and weighs about 38 tons. It has never been repaired until recently, two months ago, and in 49 months' continual use has made a mileage of 251,552. This is only one instance, but doubtless many more could be cited in favor of the practicability of economical high piston speed.—*American Machinist.*

**AN ELECTRICAL BLOWPIPE.**—The electrical blowpipe of M. Jamio, consists of a pair of carbon pencils—an electric candle, in fact—surrounded by a coil of insulated copper wire wound a few inches distant from the pencils in the plane of their axes. The current is so led that, in circulating round the coil, it will attract the electric arc formed at the lower end of the carbon pencils, and cause it to flash out almost in the form of a fish-tail gas flame. This spreading out of the arc is the special feature of the action of the apparatus. It facilitates the application of the heat of the electric arc to the fusion of refractory substances, and enables us better to take advantage of this little-used means of producing a very high temperature.

**NEW STEEL.**—M. Auhe is attracting much attention in France by a new process of converting iron into steel, and producing an illuminating gas by the process. The iron is heated to 900° Cent. in a retort with coke or charcoal; fatty matters are then injected, and dry steam forced over the heated mass; thus steel of high quality is formed and carburized hydrogen gas evolved.

## SCIENTIFIC PROGRESS.

## Ignored Facts in Electricity.

At a meeting of the New York Academy of Sciences, Prof. C. A. Seeley, in a paper entitled "Ignored Facts in Electricity and Magnetism"—fully illustrated by experiments—showed that scientists and the text books misrepresented the phenomena of static induction. It is commonly asserted that if a soft-iron bar be brought near a magnetic pole, the bar becomes a magnet with two active poles, and a point of neutrality between them located at the middle of the bar. It is stated that if an insulated conductor be brought near a prime conductor it becomes electrified, so that the minus electricity occupies the half of the conductor contiguous to the prime conductor, and the plus electricity the remote end, with neutrality between the two halves. But on testing the statements by experiment, it will be found that the induced magnet has only one kind of active magnetism, which is of the same name as that of the inducing pole, and, moreover, that it is pretty evenly distributed over the mass of the bar; it is practically a magnet with a single pole. Similarly, the free electricity of the insulated conductor is plus and pretty evenly distributed. The actual facts are susceptible of simple and unequivocal demonstration. A compass-needle, when carried along the bar, or put in any position with reference to it, turns constantly to the bar with the same pole; iron filings are attracted all over its surface, etc. The condition of the electrical conductor may be shown by pith balls or other simple electroscopes. The facts as here stated concerning electricity might have been inferred from the ordinary theory. One kind of electricity attracts its opposite, but in the act or condition of attraction the electricities are of necessity bound in such a way that they cannot have any external influence; the external influence of the bound electricity implies a release which is inconsistent with its existence as induced electricity. The case of the induced magnet is of peculiar interest, because it makes it manifest that there is here a form of magnetism hitherto unrecognized, namely, magnetism—which moves and comport itself like a fluid. This induced magnetism, as to the rationale of its production, its distribution, and its disappearance, is so remarkably like induced static electricity as to suggest the probability that they will be found to be phases of the same thing. The facts here brought to light are related to the fundamental notions of electricity and magnetism, and it cannot be doubted that they will be of importance to science and the useful arts.

**GLACIAL PERIODS.**—Mr. H. B. Norton, in a recent lecture before the Kansas Academy of Science, gave some interesting calculations respecting the glacial epochs through which the North American continent has passed, based largely upon the theories of Croll and Geikie. In his closing paragraph he remarks: "It thus seems probable that there have been many glacial periods in each hemisphere, and that the ocean, like a mighty pendulum, vibrates from pole to pole through vast but regular periods. It is not necessary to suppose a cataclysm at the end of each period, as some of the earlier writers did; but rather an insensible drainage of waters, which so gradually submerges the land and pushes the human race before it as hardly to be perceptible in the course of generations, even uncovering new continents, and opening up fresh fields and pastures new to human industry, when the old are exhausted. The Southern hemisphere is now undergoing the slow refrigeration of its long winter. This began about 6,500 years ago; it will end about the year 4,870. It has passed its middle, but not its culmination, even as the greatest average cold of our ordinary winter is nearer the vernal equinox than the winter solstice. It is probable that 2,000 years from now the southern continents will be still more deeply deluged; the Antarctic ice-cap glaciers will have extended several hundred miles to the northward, and the glaciers which have already appeared among the Andes will have covered the plateaus of Patagonia and Chile. Nevertheless we need not expect that mankind will then witness the utmost possible degree of refrigeration, because the ellipticity of the earth's orbit is now less than it has been at certain periods in the past, and will be again in the remote future."

**DEFLECTIONS IN THERMOMETERS AND HYDROMETERS.**—In a recent number of *Comptes Rendus*, M. J. Salerni calls attention to deflections in thermometers and hydrometers if used for certain purposes. Changes in thermometers ranging as high as 8° to 10° occur at printing-ink works, where oils are heated for several days to 670°, in glycerine works and with rectifiers of beezol. Glasses are not only merely modified when heated to 300°; it undergoes true deformation at far lower temperatures. Thus, the hydrometers used in sugar works, which are often exposed for a considerable time to temperatures of 95°, are affected. After an immersion of some days they are completely modified, their weight decreases and they become erroneous to the extent of 7° to 8° B. The editor of the *Chemical News* adds that in many chemical works it has been found necessary to submit all hydrometers used for hot liquids to a weekly comparison with a standard instrument.

## The Water Supply of the Earth Diminishing.

It is probable that the earth is gradually losing her superficial water, or, in other words, is drying up. This inference, which seems to be well substantiated, has been drawn by many geologists, who have given special study to the metamorphoses which the rocks composing the earth's crust have undergone in the past, and are now undergoing.

It is generally assumed that the evaporation of the water from the surfaces of our oceans, lakes and rivers is balanced by the amount of various forms of aqueous precipitations—rain, hail, etc.—from the clouds, by which the water finds its way back again to the earth. This is strictly true in the sense that not a particle of water passes beyond the limits of our atmosphere, and that all that finds its way into the atmosphere by evaporation, sooner or later is returned again. Nevertheless, the water supply of the earth is slowly but steadily diminishing. It is not destroyed, but is so modified as to be no longer available for the sustenance of animal and vegetable life since it is absorbed and bound up in the rocks. This disappearance of water is accounted for partly by mechanical absorption; partly by the chemical union of water with the constituents of certain of the rocks, called hydration, and which is one of the phenomena generally attending the superficial weathering of the rocks; and partly by the crystallization and re-crystallization of many of the constituents of the rocks, and other extensive chemical changes going on at unknown depths in the bowels of the earth. In the course of time, though necessarily many ages from the present, it is argued, the combined result of these several causes of desiccation must be the complete absorption of the water, and its disappearance from the surface of the earth. The estimate has been made, though such an estimate can be little more than a guess, that one-seventeenth of the quantity of water with which the earth was originally provided, has already been bound up chemically in the rocks, or has been absorbed beyond the possible reach of the organisms living upon her surface.—*Ex.*

## Influences of Electricity on Vegetables.

Some months ago M. Grandean, director of the agricultural station at Nancy, announced that experiments made upon Indian corn and tobacco proved that atmospheric electricity exercises a very favorable influence on vegetation. M. Maundin, director of the National Botanical Garden of Antihedea, to-day makes known some facts which go to prove directly the opposite. He experimented on other plants and in other climate, and, as will be seen, he draws the conclusion that M. Grandean's inferences were too general. According to him, atmospheric electricity, like all other agents of vegetation, plays a useful part, but which, in its absence, can be replaced by another force. The experiment was made in the following manner: In a kitchen-garden bed, well exposed to the light, two squares of 51 decimeters each were selected at seven meters apart, and in each was planted a bunch of dwarf kidney beans, a lettuce, a tomato plant and two cotton seeds. One of the beds was left to itself and the other was covered with an iron cage, the four uprights of which terminated in points to attract all of the atmospheric electricity. For a fortnight the two cultures appeared to be alike, but at the end of this period a difference was observed between them, and the difference, which was to the advantage of the cage, kept increasing more and more. The bean plants under the cage were much better developed and much richer in seeds than those in the open air. As for the lettuce, its height in open air was one meter, and under the cage 1.20 meters; its total weight was 337 grammes in the open air, and 427 grammes under the cage. The tomato plant in the open air had attained a height of 0.8 of a meter, and under the cage, one meter; its weight in open air was 0.072 of a kilogramme, and under the cage 3.754 kilogrammes. While under the cage the plant bore 83 tomatoes, weighing 2.162 kilogrammes, the number on the plant in the open air was only 37, with a weight of 1.08 kilogrammes.—*La Nature.*

MR. EDISON has made a great many experiments to determine the most suitable material for the filament in his electric lamps, and as yet has been unable to find just what kind he wants. Cardboard failed, and now various woody fiber are being tried. Mr. Edison, it is said, finds that medullary rays, or the little lines seen in a cross section of exogenous woods, extending from the center to the bark, offer some obstruction to the free passage of the electric current. Pith also offers greater resistance to the current, so that different parts of the horse-hoe filament acquire varying degrees of brilliancy; and Mr. Edison is reported as saying that unless fiber can be obtained entirely free from pith, his lamp will remain imperfect. We understand he has sent a man to Brazil to find the pithless fiber, and it remains to be seen whether or not he succeeds in obtaining something sufficiently free from pith to answer the purpose.

A NEW coloring substance extracted from the wood of the heather or poplar directly by treatment with a hot solution of alum, obtains a liquid of a bright yellow color which deposits a greenish resin. It is called *Eriene*.

THE globular form of the earth was first suggested by Thales, of Miletus, about 610, B. C.







improved copper plates and other paraphernalia for a thorough test of the ore. If their expectations are realized, they are glad and determined the old Pochontas shall give a good account of herself.

**PROSPECTING.**—*Georgetown Gazette*, Jan. 22: Prospecting is unusually brisk along the divide this winter. We already hear of a number of new claims being taken up, and are long expected to treat our readers with some interesting mining strikes. We are glad to see this activity among prospectors. We understand that in not a few localities, prospectors are annoyed by parties claiming ground to which they have no legal title. No man has a right to hog it in this way over the prospector, and we would advise the prospector, where he has doubts about a man owning "the whole country," to test the legality of the matter should he find a favorable prospect.

**OTTER CREEK.**—There are quite a number of mines being operated this winter on the Otter Creek divide, with good prospects in sight. Mr. E. C. Cheek & Sons are running 2 claims, and several others are piping and ground-sluicing with good results. The Cal. W. & M. Co. have dug a new ditch and put the water on that ridge, which will be a great help toward developing some of the best mining country of this divide.

**F. KANTZ** is erecting new hoisting works at the Eureka mine. When completed they will be similar to the works at the Rosenbergs mine. The Eureka will then have the most complete pumping and hoisting gear of any mine on this divide.

Crack late rains have softened the ground so that miners will have to be cautious in their open cuts, or we may hear of more accidents.

**JOS. SWANEY** has sold out his one-half interest in the Barney hydraulic mine, which lies south of the noted Whiteside mine, to A. Baldwin and J. A. Wolf, who now become partners with Henry Jones in the mine. The new owners are favorably known as practical, go-ahead miners, and, judging from what we hear of the mine, they will make it pay handsomely.

**HARRY MOORE** is continuing driving away developing his Golden Fleece quartz claim, on Bald mountain. It looks better as he progresses.

**L. N. RECORD** is running a hydraulic on his claim, near the junction of Manhattan and Badger, with everything looking well.

**INYO.**

**LOOKOUT.**—*Cor. Independent*, Jan. 22: The Modoc furnace has been making a very successful run, under the management of J. J. Williams. Will turn out in the neighborhood of 100 tons of very rich bullion. The Secretary of the company has written to this place telling the Superintendent to keep 15 good men here, as they intend to resume prospecting as soon as the run is over. Frank F. Field and J. J. Williams are negotiating for a lease of the Minnetta mill, and, if they are successful, it will give employment to 15 men for 3 months. There is 100 tons of first-class ore, 100 tons of second-class and 2,200 tons of tailings. The Snow Canyon mine is running on tailings, and will crush ore inside of 10 days.

**MARIPOSA.**

**HAMBLETON MINE.**—*Mariposa Gazette*, Jan. 19: We understand that the 5-stamp mill recently erected upon the above mine is about ready to test the quality of rock produced therefrom, which previous assays have shown to be very rich in both gold and silver. This mine is located about 5 miles southeast of town on the waters of the Chowchilla, and is partially or wholly in the hands of new men, who are said to have sufficient capital to give the mine a fair test of its producing qualities.

**MONO.**

**BODIE ITEMS.**—*Free Press*, Jan. 19: At no time in the previous history of Bodie has the mines showed such a marked improvement all along the line in any one week as they did during the week ending with the 15th instant. The Syndicate is turning out a steady stream of bullion, the ore paying much better than was anticipated. The Tioga is crosscutting west on the 682 level, the crosscut being in 18 ft. The Standard has started a crosscut west on the 1,000 level, to cut the large veins which have yielded so enormously on the upper levels. These deep workings have taken most of the water from the 600 level of the Jupiter, and drained the Bodie entirely, so that sinking the main incline in the latter has been resumed in order to get water for steam purposes, and sinking will probably soon be resumed in the middle winze below the 6th level, which winze was abandoned on the 8th of September last on account of water. The bottom of this winze is in a vein 5 ft wide of high grade ore. The quality of the ore mined from this level has shown a marked improvement in quality, and a still further improvement is confidently expected this week. The Champion is driving south in a body of fine ore, which is steadily improving. The Jupiter will shortly crosscut east from the south drift, 600 level, to prospect an encouraging looking vein formation in that direction. The Goodshaw will commence hauling ore to the Miners' mill to-day, and has a large supply stored in the north drift from the main east crosscut, 600 level. Ore is being stored from the Easton vein (No. 20) in the Bodie tunnel, and this will be run through the Miners' mill as soon as 200 or 300 tons of Goodshaw ore can be run through. Work will not be resumed in the Oro until the Red Cloud shaft drains the water, as it would be an expensive piece of folly for Oro to start its pumps, as no work save pumping could be carried on before the Red Cloud gets to pumping from a depth below that attained by the Oro. The Silver Bell mill will start to-day, and the Spaulding mill will start on Spaulding ore about the end of the week. The ore breaks in the Spaulding are improving. The 500 level of the Noonday is opening up splendidly, and the resumption of work in a long abandoned winze in the east vein, below the 500, reveals the fact that that fine ore body is increasing in size and improving in quality of ore as depth is attained. Some drill holes run into the vein from the north drift, 300 level of Boston Co., shows the ore to be of a good milling quality, the drillings including the porphyry wall gone through—giving assays from \$15.14 to \$43.05.

**NEVADA.**

**THE WATER SUPPLY.**—*Nevada City Transcript*, Jan. 20: There is an abundance of water throughout the mining region to satisfy even the hydraulic claim owners, and the monitors are all kept busy. The South Yuba company are running 2,000 inches in their Chalk Bluff ditch, and 1,700 to Blue Tent. All the other ditches in the county are also full.

**D. T. HUGHES' CLAIM.**—Mr. Hughes is pushing matters as rapidly as possible in the opening up of his hydraulic claim at Blue Tent. H. S. Bradley has made the necessary survey for a ditch to convey water from the ridge ditch to his reservoir, which is being enlarged and improved, and when completed will give a sufficient fall for piping. Six weeks or two months will probably elapse before the mine will be ready to work, and then it is proposed to put on as large a force of men as can be employed to advantage, and the claim will be opened up without delay.

**PUMPS READY FOR WORK.**—*Grass Valley Union*, Jan. 20: The new 12-inch plunger pump has been put in place in the Ophir shaft, and is about ready to commence lifting the water. This pump reaches from the 6th to the 10th level. From the surface to the 6th level a 14-inch plunger is used. During the setting of the lower pump the water gained about 30 ft in the shaft, but did not rise as high as the 10th level. The 10th level 2 powerful pumps the mine will soon be drained, and no further difficulty will be experienced in holding the water.

**SCOTIA MINE.**—Owing to the heavy inflow of water in the Scotia mine, which the present machinery is unable to handle, the work at the mine has been discontinued until a larger engine and pump of sufficient capacity to handle the water can be set up. This will require some weeks, but no unnecessary delay will be made, and when operations are resumed the work will continue without further hindrance. The ledge in the bottom of the shaft is of good size and of excellent quality, and every confidence is felt that the Scotia is going to make a valuable mine.

**ALPHA MINE.**—In an item about the Alpha mine yesterday the types incorrectly stated that 19 ounces of amalgam were recently cleaned up for 12 working shifts, when they

should have said 90 ounces. The regular daily clean-up of amalgam at the Alpha is from 8 to 10 ounces.

**THE MASAZITA MINE.**—*Nevada City Transcript*, Jan. 25: The Masazita company's hydraulic claim in the northeast edge of the city is being worked to good advantage this winter under Mr. Gowell's superintendence. But 4 Chinamen are employed, the remainder of the 30 employed being white men. Two monitors are in operation day and night, using 1,400 inches of water, all of which is obtained from the company's new ditch, which heads at Scott's flat.

**A. EVANS' CLAIM.**—*The Eureka Bros.*, who are working on Deer creek near the Le Compton, have 6 or 7 tons of apparently rich ore now on the dump, and will soon have another crushing. These boys deserve credit for the perseverance they have displayed in opening up this claim, and there are older men now spending their time in croaking who ought to take a few lessons from them.

**PLUMAS.**

**GOTO STRIKE.**—*Greenville Bulletin*, Jan. 19: No new developments, but work is continuing steadily, so far as we have been able to ascertain.

**CURETTE.**—No hauling has been done at this mine since the commencement of the last severe storm, the roads being so bad as to render it impossible. It is expected that work will be resumed early next week. A new steel wire rope for hoisting purposes arrived last evening, and has been sent to the mine.

**ATLANTIC.**—At this mine the tunnel is now in a distance of 60 ft, and they expect to strike the ledge in a few days. Work is being pushed forward with energy.

**GREEN MOUNTAIN.**—An extra force of tenders was placed upon the ditch during the last storm, to watch the pipe and guard against breakages in the ditch. Only one occurred, which, by prompt attention, was soon repaired, and resulted in a delay of 10 hours. Up to the present there has been no further stoppage necessary, and the mills are running steadily. Continued good reports come from the property, and the owners have many reasons for congratulation. The face of No. 5 tunnel is advancing in good milling ore, which has continued to improve ever since the chimney was first encountered some weeks ago. All other portions of the mine are yielding ore abundantly, sufficient to keep the mills constantly supplied.

**GRANITE BASIN.**—*Plumas National*, Jan. 22: Mr. A. Swan reports everybody busy in this flourishing mining camp, and arrangements being made for very active work during the coming season. Mr. Swan brought us some fine specimens, one in particular, a boulder found in one of the ravines, which is filled with free gold, and is a beauty. With the introduction of the proper improvements and appliances for saving gold, the Granite Basin district will prove one of the richest in the country.

**SIERRA.**

**BLUE GRAVEL.**—*Mountain Messenger*, Jan. 22: The B. M. Ex. Co. have now run some distance in blue gravel. The tunnel has been all in gravel for the past week. Several carloads were washed last Tuesday and a prospect obtained. The gold is light and scaly, as would naturally be the case, as the bedrock is the tunnel now is. The indications seem to be very favorable.

**WATER.**—The Bald Mountain company has plenty of water to wash all the time now. They have washed out the small dump and made a large hole in the large one. The water will probably hold out long enough to clean-up that also.

**KENDALL & NOBLE** have bought the lot of mining ground on the hill north of the Catholic church, and will enlarge the ditch that carries water from Red Dog.

**FLORANCE.**—Work is being prosecuted on the Florence quartz ledge, situated on the ridge above Forest City. S. Stephenson and others are the owners.

**NORTHERN SIERRA.**—L. P. Sihley and Jacob Gross arrived from the northern part of the county Tuesday, and report a favorable condition of affairs in that rich mining district. They journeyed the entire distance on snowshoes, from Howland Flat to within 25 miles of town, via Fort Wint and the new ditch. They expected that water will be brought through the new ditch, down the St. Louis and up the Greenwood ridge, within a few days. The Bonanza company is doing handsomely. Out of 11 carloads of gravel last week was realized \$190. Liberty & Co., Port Wine, are hydraulicizing day and night; fair prospects of doing better than last year. Some work is being done at Morristown, but the frozen water seriously derates operations. A full head, sufficient for 2 monitors, is running at Eureka. Virginia company have their air shaft completed, and are taking out enough pay gravel to cover expenses. Expect dividends are the coming spring.

**TRINITY.**

**TAYLOR FLAT.**—*Trinity Journal*, Jan. 22: Trinity river visited the Taylor Flat mine last week and its mark on the way of damage. We also learn that the ditch slid, and there were some breaks in the flume; also that it will be 3 or 4 weeks before everything is in running order again.

**DAMAGE ON NEW RIVER.**—While the late freshet following the heavy rains of last week did but little damage in the northern portion of this county, the Lower Trinity and New River sections did not escape so fortunately. The damage done there, and in fact the only real disaster occurring in the county, was the complete destruction and carrying off of the fine new steam saw-mill only recently erected on New River, about 4 miles above the mouth of that stream, by the contractors who were building a ditch and flume for the New River hydraulic mining company. This mill, as we are informed by Mr. Robert H. Palmer, chief engineer, was one of the most complete and smoothest running saw-mills in the State. The machinery had all been packed to New River from Arcata, the boiler being made on the ground. The dam was 200 ft long, and the water poured over it fully 10 ft deep. It was just 7 minutes from the time it broke around the end of the dam until the mill was gone, together with the ground on which it stood and everything else within 40 ft of its site, including about 60,000 ft of lumber, 150,000 ft of logs and a number of bents ready framed for the flume and to be forwarded to the front. Damage was about \$20,000. A new mill will have to be built.

**NEVADA.**

**SIERRA NEVADA.**—*Gold Hill News*, Jan. 24: The incline upraise from the 2300 level to meet the vertical shaft at the 1700 level was advanced 30 ft during the week; total length, 430 ft. The south drift, between the 2400 and 2500 levels, is now in 64 ft south of the winze down from the 2400 to the 2500 level. During the week 71 tons and 200 lbs of ore were raised.

**OVERMAN.**—East drift, 2275 level, has been extended 20 ft; total length, 173 ft. Stopped drift on 18th inst. to drill with diamond drill to ascertain how far we can continue the drift without danger of being drowned out by the water. Have drilled 110 ft and cut a small stream of water 95 ft.

**CALIFORNIA.**—During the week 297 tons of ore have been extracted and sent to the mills; assay value, \$19,46.

**CON. VIRGINIA.**—During the past week 495 tons of ore have been extracted and sent to the mills; average assay, \$21.79.

**MEXICAN.**—On the 2500 level the joint Ophir east winze has been sunk and timbered 17 ft, and a tank-pit is being cut out at the 2600 level.

**OPHIR.**—On the 2500 level the joint Mexican east winze has been sunk and timbered 17 ft. Cutting out a tank-pit at the 2600 level.

**CALIFORNIA.**—Pumps have run an average of 14½ hours per day, consuming 6 cords of wood per day. Have completed repairs to drift on 1600 level. Porman shaft has been sunk and timbered 20 ft; total depth, 1,675 ft.

**UNION CO.**—On the 2500 level the joint Mexican west crosscut has been extended 15 ft, the joint Mexican east crosscut 29 ft, the joint Sierra Nevada east crosscut 52 ft, and drill hole No. 7 from the bottom of No. 1 winze has been extended 150 ft.

**UTAH.**—The east drift on the 2150 level has been extended 24 ft, the ground being soft.

**CANDELARIA DISTRICT.**

**NORTHERN BELLE.**—*True Fissure*, Jan. 15: The crosscut from the 4th level drift of the Northern Belle mine has been discontinued, and from the crosscut a drift has been started which has been extended 14 ft during the week in favorable looking formation, giving assays ranging from \$10 to \$25. There is no change of importance in the 3d level. The 1st and 2d levels look fully as well as at any time in the last few months. In the level above the adit all work has been productive of good results, especially in the 5th, 9th and 10th, where the ore stops look very promising. The roads are now in fine condition and the teams are hauling to the mills 35 tons of ore per day. Both mills are running steadily and doing good work. The regular monthly dividend of 60 cents per share has been declared payable to-day. The shipment of bullion for the January account to the 12th was \$33,330.83, and for the week ending same date \$20,643.35.

**ESMERALDA DISTRICT.**

**RECORDED STRIKE.**—*Esmeralda Herald*, Jan. 22: Rumors have been flying around for several days past that a rich body of ore had been uncovered in the Prospectus mine. Though the likelihood of such an occurrence taking place at any time is looked for by many, the present rumor is more than likely the result of the order given by the Superintendent prohibiting visitors from going through the mine.

**REAL DEL MONTE.**—Drifting is still continued on the 800 level. Work on the 575 tank station goes ahead. At this time there is an immense body of water being handled by the pump.

**EUREKA DISTRICT.**

**STRIKE.**—*Eureka Sentinel*, Jan. 19: There were many rumors upon the streets yesterday about the "Albion strike." The size of the body, the ore it is, etc., was all explained to the *Sentinel* reporter 2 or 3 different times during the day, and there were as many locations for the same as there were stories.

**MOUNT ROSE DISTRICT.**

**SPRING CITY.**—*Silver State*, Jan. 21: D. McPeters, who has been in business in Spring City almost since the organization of Mount Rose district, is in town. He says the snow is 3 ft deep in town and much deeper on the mountains, where it has drifted to a depth of 10 or 12 ft in many places. The Bullion of Paradise company, has resumed operations at their mill, but they experience much difficulty in getting ore from the mine, in consequence of the almost impassable condition of the roads. He thinks that during the City will be a lively place again next spring, when the Paradise Valley and other companies will resume work. He has no doubt of the richness and permanency of the mines of the district.

**TAYLOR DISTRICT.**

**ONE.**—*Ward Reiter*, Jan. 22: W. N. McOill, who was in Taylor district last week, estimates that there are 1,500 tons of milling ore in sight in the Prince mine, in that district, owned by Robert Briggs and W. O. Lyons. This will be a comfortable starter for the mill to be erected on the headwaters of Steptoe creek next spring. This, together with ores from other mines in the district, will keep the mill running without fail.

**TRINITY DISTRICT.**

**MORNING STAR.**—*Silver State*, Jan. 21: We are informed that the purchasers of the Humboldt Irrigation & Development Company's canal, at Orona, are negotiating for the purchase of the Morning Star mine, in Trinity district. The Morning Star is an extension of the Evening Star, which produced hundreds of thousands of dollars in early days from ores extracted above water level, but which was abandoned when water was encountered in the works. The ledge is located in a syenitic formation, and the ores are rich in gold and silver. It is situated in the Trinity mountains, about 8 miles west of Orona.

**TYBO DISTRICT.**

**RENNING.**—*Cor. Belmont Courier*, Jan. 19: The Tybo Co. mining company's mill is running steadily with good results. The 2-G mine is sending forth its regular supply of ore, and Mr. Frank Newell, who resigned his position as foreman on the 5th inst., says the mine looks well, there being enough ore in sight to keep the mill running for years to come, and everything is running smoothly under the new administration of Mr. J. E. Norris, who succeeds Mr. Newell as foreman of the 2-G mine. Mr. Luse has struck a fine ledge of ore, and before long the Independence will realize a handsome fortune to its owners.

**ARIZONA.**

**GLOBE NEWS.**—*Silver Belt*, Jan. 15: Work is still going on at the Red Rover, under the direction of Messrs. Vail & Hayse. Mr. Vail reports, after 3 weeks prospecting and assaying, that the property far exceeds his expectations. He is continually finding something new and unexpected. He is now staking ore in the dump that will not only pay all expenses, but a profit besides. It is reported that D. O. Chilson has bonded a group of mines near the Blue Bird mine of the Messrs. Middleton. The Mack Morris mine is yielding, without stopping, a sufficiency of ore to keep the Arizona Mexican mill constantly in motion. The tunnel of the La Plata is yielding same character of ore as taken from the Mack Morris. The Emazetta mine has had 2 shafts, 125 and 50 ft, and 200 ft of drifts opened since August. Ore very similar to that of the King. Bollinger, of Mineral creek, who has opened a really fine ledge of copper ore there, has written to a friend in this place that his "machinery is at Casa Grande, and will be smelting copper ore in 60 days." We have spoken of this ledge in a former number, and then as now, regard it as an extraordinary fine property. The Fame mine, in charge of Fred Medler, is yielding fine ore, which will be worked in the Champion mill. An assessment was being done on the Vallada mine, a blind ledge was struck which had the appearance of being a valuable one, both as to quality and quantity of ore. The Champion mill is reducing ore from the Champion mine. The Golden Eagle mill and mining company paid off Wednesday.

The King mine is still King, and, as sunk upon, improves as depth is attained. At 500 ft the vein of ore is 81 ft in width, and all bears a sufficiency of silver to warrant in being worked. The mine is in good shape, and the magnitude of the output can be imagined when the dump is estimated as showing more ore than the present capacity of the works can reduce in 3 years; but fortunately the company is progressive, and have ordered efficient additional machinery to insure the reduction of 75 tons of ore daily. Seventy-five tons, although seemingly large, is a mere medium of what the mine is capable of yielding. Its capacity is only commensurate with the number of tons of ore that can be raised from it, by improved machinery. Had this deposit of ore come under Mendoza's explorers observation, 3 centuries ago, they would not have been withdrawn by his order from what is now known as Arizona, because of the want of a sufficiency of silver to satisfy Spanish cupidity. The King mine is simply wonderful, and when better known it will be regarded as dwarfing the best of the Nevada bonanzas in their palmy days.

**IDAHO.**

**IREMS.**—*Yankee Fork Herald*, Jan. 18: Challis has largely improved in business since the introduction of capital into the mining districts surrounding her. Trade with the mining camps has been good all fall and winter, and more large business houses will be erected early in the spring. Nearly all of the prominent mines in the district are working, and the portion of the mineral belt are being worked this winter. Vast quantities of high grade ore are accumulating on the dump, and universal activity is being displayed all along the mineral range. The Ramsborn shows much high grade ore. The Redemption Co. has 6 men at work taking out ore, and is keeping up its reputation as a producer of first-class ore. The Silver Bell has been sending ore, for months past, to the Klaminick reduction works. The Gunter is getting coal and ore on hand for early spring operations.

**SQUAW CREEK.**—The mines on Squaw creek are developing even better than was expected. Several companies are getting out ore, and a number of the ledges are beginning to show horn and native silver in quantity. Cal.

Kirk's mine, located last summer, is 40 ft wide, and in this are streaks of very high grade ore. The Red Bird mine, on Squaw creek, owned by the Salmon River Mining and Smelting Co., of Omaha, continues its extraordinary yield—over 20 ft—and much ore is accumulating on the dumps.

**MONTANA.**

**ALTA-MONTANA.**—*Helena Independent*, Jan. 18: For the first 8 days of this month the average daily output from this mine has been about 40,000 lbs that assays 145 ounces of silver per ton. The slopes in the levels are all in good ore end are being rapidly extended. Already in the 2 lower levels, one of which is 500 ft down from the surface openings, the stoping ground covers a distance of 565 ft, beside the new ore body found in the crosscut, which is opening out with great promise. The daily bullion product is 5,794 lbs, and the last car-load, just weighed, carries 355.60 ounces of silver, besides \$95 gold per ton.

**THE ALMON.**—This mine has only been able to work through the small mill, at Mt. Pleasant, about 400 tons of their ore. They have 200 tons still in the mill, and a vein, now 10 ft wide, that has thus far yielded not less than about \$50 gold per ton.

**BONANZA CHIEF.**—The shaft on this mine is now down about 80 ft, and the ore body is uniform, and free gold is shown at the deepest point reached.

**THE ROADWAY.**—*Silver Star*. This famous old mine is still making a history that would be of no little mining region. Their mill has run for years, and never a single month without paying a profit. After these years of endeavor "to dig it out," the report comes that the ore is boundless. It is not high grade, but very free.

**THE HECLA CO.**—It is rumored that this company has sold out their works and mines to the old Telegraph Co. for \$2,000,000.

**THE MONTANA COPPER CO.** of Butte, have just bought a claim on the Burlington lot for \$35,000. This company is now treating 25 tons of copper ore per day, and will soon quadruple their capacity. They have 3 large reverberators and 1 matte furnace running, and are building another matte and a blast furnace. The ores treated average only 12% to 14% copper, but by means of their 4 jigs and 2 Froe carriers, they make 5 tons of matte per day, now, they carry 55% copper when shipped. They will soon be making 20 tons per day.

**THE DEER LODGE.**—Patrick Senno and John O'Brien are sinking the shaft on this old 50 ft deeper, when levels will be run for exploration. A few which has been built and the mine put in thorough order for work.

**THE ONLY CHANCE.** of Highland, Deer Lodge county, has been successfully worked, though with very crude and meager appliances, for a number of years. Messrs. Eddy and Grenier have recently made an examination of the property for Eastern parties, who contemplate purchasing it and putting it into first-class working order. A 20-stamp mill, hoisting works and every available kind of machinery requisite to render it perfect in its operation will be furnished as soon as the weather will permit of transportation.

The Bluebird mine, of Mt. Pleasant, which has always produced ore of a high grade, is now opened by a drift from the 100 level on the Hickey for a distance of 75 ft past the main boundary line, and an ore body 7 ft wide is exposed which is said to run \$40 per ton in the mill.

The Hickey shaft is over 225 ft deep, and the old chute of pay continues and has widened out to 10 ft. The average in this mine has never been under \$30, and the last clean-up from 100 tons of the ore, run under 5 stamps, averaged nearly \$35.

The Little Jennie shipped to the Alta-Montana works 2,450 lbs of ore that carried 202.39 ounces of silver, 14,140 lbs, the yielding 107.32 ounces per ton; and recently from the dump of second-class ore, which is said to contain 1,400 tons, 23 tons that averaged 102 ounces of silver per ton—and the remainder is said to be as good.

**PHILIPSBURG ITEMS.**—*New Northwest*, Jan. 21: There are 17 men at work on the Granite Mountain ledge, which was lately bonded by Mr. Charles Clark for \$400,000 from Holland & Estill. One tunnel of 100 ft run along the ledge shows an average width of 4 ft, going as high as \$170 to 100 ft of silver. A shaft is down on the vein 60 ft, with 6 ft of ore at the bottom. Another tunnel is in 73 ft. Negotiations are said to be pending with Mr. Clark for a 4 years' lease of the Northwestern mine. It is also rumored that the Hope M. Co. contemplate erecting in the coming season a 20 stamp mill, with a roaster for treating the base ores of the Cliff mine. The new hoisting works at the Algonquin mine will be finished in a few days, when stoping will begin on the 340 level. Steam hoisting works are being put on the Salmon mine east spring, which works when employed will employ 3 men to where there is 1 employed now, and there are 120 men in the company's employ.

**NEW MEXICO.**

**STAKE BY THE CARROLLTON CO.**—*Grant County Herald*, Jan. 22: On the Old Firm the vein the first struck was about the width of a knife blade, but as they descended it gradually widened until it reached an extent of 3 ft, and continues widening as they go down. The lowest assay was \$100 in gold, and the highest \$3,000, with 10 to 30 ounces in silver, although pieces could be picked out that will triple these figures.

The Carrollton mill is rapidly progressing under the superintendence of Capt. West, who is working 20 men. The frames for the pans and settlers are completed, and are a very solid piece of workmanship. The concentrators are already set, and the greater part of the machinery is on the ground. The completion is now only a question of a few weeks, and will be boded with delight by the miners of Grant county. A custom mill has been our greatest need for years, at last we have obtained it.

**OREGON.**

**HYDRAULIC.**—*Oregon Sentinel*, Jan. 15: Sam Lackland is making the dirt fly with the hydraulic pipe in the Star Oulch claim, on Applegate, and deserves a big clean-up.

**TOM KATHER** is busy delving in his claim, at Fort Lane, having ample water and fully expecting another harvest of rich pieces.

The recent heavy rains have started the water in every mining camp and given an impetus to mining industry that promises a rich gold harvest in the coming season. The Centennial mine, near Willow Springs, is now under the superintendence of David Benner, and is being worked with a full head of water.

**KITPEL & KEATON**, on Poorman's creek, are rushing dirt through their flume with an immense head of water, and say that their prospects are excellent.

**ORE** has been discovered opposite Kerbyville, supposed to contain silver. It is not so far away as the dollar of our dimes, and probably contains more iron than anything else.

The Sterling, English Co., Blue Gravel, Applegate and all other large hydraulic mines in this and Josephine county, are now running with full heads of water and good prospects of continuance.

**FRANK ENNIS** is authority for the statement that Green Bros., of Onice creek, are now taking out richer gold-bearing rock from the Sugar Pine ledge than it has ever yielded before. These gentlemen are running their arrastras steadily and evidently have a profitable mine.

**UTAH.**

**CITY ROCKS.**—*Salt Lake Tribune*, Jan. 20: The miners at City Rocks were not visited by slides, and work is going ahead as usual at that mine. From American Fork report the canyon full of slides, some tall enough to cover the Walker horse. On Wednesday last 4 improved Ingersoll steam drills were shipped from New York for the Moulton mine.

The late strike in the Rebellion mine, Thayne's canyon, has created great excitement among the owners of property in that part of the Park country.

The owners of the Bingham Black Rock tunnel are said to be making money. Since the completion of the new shaft, they have struck rich pay gravel, which is panning out well.

This recent strike in the Moulton is widening as depth is attained. This is an agreeable surprise to the company, as they did not anticipate striking ore till the 200 level had been reached.



### Our Coast Steamship Trade.

The coasting business of this State, Oregon and Washington, which was formerly done almost entirely by sailing vessels, is now done mainly by steamers, the coasting schooners decreasing as the steamers increase. And this is especially the case on the coast south of San Francisco. The railroads have taken some of the trade, it is true, but it is mainly done by the steamers of the Pacific Coast Steamship Company, which stop at all available points on the coast. The southern coast route is a smooth and pleasant one as a general thing, the winds being light and sea smooth in summer, and the greater part of the winter.

Our northern coast, however, is very different. As we go north from San Francisco the winds grow stronger and the seas are heavier. During the summer months, when the trade winds prevail, the northern trip is apt to be rough, but the Pacific Coast Steamship Company have provided vessels built specially for the trade and constructed with great strength, so as to be both comfortable and safe. The trade to Oregon grew gradually so great that the company found it necessary to have built for that trade a first-class iron steamer, fitted with all modern appliances and conveniences.

This steamer we give an engraving of on this page, so that our readers will have a good idea of the class of vessels used for the northern coast trade. Her name is the *State of California*. She is 315 ft. long, 37 ft. 3 inches beam and 26 ft. depth of hold. She is registered at Lloyd's as A1 for 20 years. This ship, built at an expense of \$350,000, is probably as complete in her appointments as any afloat in American waters. From the hinges of the doors to one of the most powerful engines, there is not a place where the latest inventions in mechanics and navigation are wanting.

Among those which combine the useful with the beautiful is the folding berth, whereby a family or party engaging two state-rooms, can use one as a sleeping and the other as a sitting room. By a shifting of bed boards, a state-room containing three berths can be reduced to two, or vice versa, thus making its cabin-passenger capacity 200, and as many on deck. Another noteworthy change is the substitution of a revolving chair for the old style—something that will, doubtless, be appreciated by persons given to sea sickness on the slightest provocation. There are 63 passenger state-rooms, seven of which are folding. The dining-room is 40 ft. long by 34 ft. wide, and "Social hall," or the sitting-room on the "next floor," 24 by 40, finished in French walnut, bird's eye maple and Hungarian ash. But, perhaps, that innovation on the ship which is most useful and has more than a local bearing is the adoption of the electric light. When to the intensity is added its penetrating quality—the power to light up the densest fog—its importance is plainly perceptible. Not the least of the valuable adjuncts of the ship is its fore and aft water-tight compartments, by which the vessel may be lightened; the splendid apparatus for extinguishing fire; the improved davits for lowering lifeboats with speed and accuracy; the iron masts, which are used for ventilators, and steam-steering gear of the latest manufacture. She has one compound, direct-acting, inverted surface-condensing engine, high-pressure cylinder, 43 inches in diameter; low pressure, 73 inches each, 51 inches stroke, capable of developing 2,000 indicated horse power; six return tubular, with a capacity of 80 lbs. per square inch.

This fine steamer has registered 14 knots an hour several times. She is fitted with all the appliances for handling freight quickly and conveniently.

**UNDERGROUND SURVEY.**—R. H. Stretch, geologist and mineralogist, is making a most careful and exhaustive survey and examination of the lower levels of the Comstock for the Clarence King report. Mr. Stretch is familiar with all the upper sections of the lode, having thoroughly examined and carefully mapped them for Mr. King's former work, published by the United States Government. He also made frequent examinations of the mines at the time when he held the office of State Mineralogist of Nevada. Mr. Stretch is one of the most thorough and careful workers ever seen in the lower levels. Even the miners are surprised at his powers of endurance and his persistency in the pursuit of an object. In his present work Mr. Stretch will be able to show some curious changes that have taken place in the structure of rock formations with depth. In this he will be greatly assisted by sections carefully prepared from microscopical slides. From these, beautiful and instructive colored plates will be prepared.

THERE are 11 mining locations in this State named after President-elect Garfield.

WIRE cables for the C. & C. shaft cost \$3,412 last year.

### License Collections and Mining Stock Certificate Tax.

The following letter and memorandum, relating to the stock-certificate tax and expenses of collecting the same has been forwarded to Sacramento by License Collector Sinton:

SAN FRANCISCO, January 19, 1881.

Hon. Joseph Watson, Sacramento City—DEAR SIR: Inclosed please find memorandum of all collections under the ten-cent tax on stock certificates, from date of operation to let of January inst.

You will observe the steady decrease during the last two years and the collections thus far in this quarter indicate a still further decrease.

The whole matter, as to amount, depends entirely on the condition or activity of the stock market, and, while the decrease may be great, the expense attending the collection remains necessarily the same for the reason that the same time and labor is required to collect 10 cents from a company as \$10. The same papers, affidavits, calls on secretaries, entries in books, etc., including stationery, being the same in both cases; then the number of corporations is on the constant increase, so that I do not readily see how the expense can be reduced. There are now between 8,000 and 9,000 corporations to be examined and more or less collected from those who pay every three months, while those who do not pay anything one quarter may do so the next, and hence, require the same labor and looking after. The expense is at present and has been all along, two clerks, at \$1,500 each, \$3,000; stationery (about), \$500; total, \$3,500.

The following is a memorandum showing all collections arising from the 10-cent stock certificate tax, from the date of operation of the law,

spring to the Great Basin company's boarding-house.

The Great Basin mining and smelting company, of which Gen. P. E. Connor is managing director, have a smelter in Stockton. At present they have one stack in operation, reducing about 25 tons of ore per day; turning out about five and one-half tons of bullion, which runs 100 ounces per ton. The company also have concentrating works which reduce about 100 tons of ore per day to 20 tons of concentration by the wet process. This company, which is a Boston incorporation, is an able one, and all the best appliances are being introduced for operating their mines and works.

### Sulphur in Sulphides and in Coal and Coke.

The following paper by Thos. M. Drown, M. D., of Lafayette College, Easton, Pa., was read at a recent meeting of the American Institute of Mining Engineers:

The use of bromine as an oxidizing agent, particularly for sulphur, has become very general in analysis, replacing the stronger oxidizing acids. The object of this paper is to describe briefly the experiences which we have gained with this reagent in the laboratory of Lafayette College in the oxidation of metallic sulphides.

Most of the simple sulphides, as blende, pyrite, etc., when exposed to the combined action of an alkaline hydrate and bromine, and finally to hydrochloric acid, are completely and promptly dissolved. The procedure is as follows: The very finely pulverized mineral is first treated, in a beaker, with a solution of sodium hydrate of a specific gravity of 1.23, and heated; bromine is then cautiously added to supersaturation, and finally hydrochloric acid to acid reaction. If any of the sulphide is not taken up,

more sulphur. On combustion, however, or by complete oxidation, either by oxidizing acids or by fusion, additional sulphur may be obtained, which must represent that combined organically with the coal.

The following are some of the results obtained by Mr. Shimer from bituminous coals by the bromine method. The amount usually taken for analysis was between one and two grams:

Bituminous coals.	Total sulphur by fusion with alkaline carbonates and nitrates.	Sulphur by bromine process.
I.	0.43	0.035 0.035 0.035
II.	2.16 2.17	1.800 1.810 1.810 1.830 1.840 1.850 1.870
III.	1.17 1.18	0.710 0.713 0.717
IV.	1.43 1.49 1.50	1.098 1.098 1.100 1.100

In comparing the bromine method with others it was found that the treatment with hydrochloric acid and potassium chlorate gave on coal with but little sulphur in the form of pyrite the same results, but on coal with much pyrite the results were decidedly lower than by the bromine method. But too few experiments were tried on this point to be decisive. The action of nitric acid and potassium chlorate depends upon the nature of the coal. Some coals are converted partly into a brown unmanageable solution, and others are oxidized completely to a clear solution. In the latter case, of course, the total sulphur could be obtained.

As was said above, the sulphur obtained by the bromine method represents both the sulphides and sulphates in the coal. The methods ordinarily given for the separate determination of calcium sulphate are faulty. Sodium carbonate readily attacks pyrite, and dilute hydrochloric acid and even water, when heated for some time in contact with pyrite, with access of air, contain notable quantities of sulphuric acid. It would seem, therefore, necessary to dissolve out the calcium sulphate by means of water with the careful exclusion of air.

The determination of the total sulphur in coal by means of fusion with alkaline carbonates and nitrates, or chlorates, I find unsatisfactory, owing, I think, to the large amount of salts in the solution in which the barium sulphate is precipitated. A much better method is to burn the coal in a platinum boat placed in a glass tube in a current of oxygen. The products of combustion may be absorbed by a solution of bromine in hydrochloric acid, or by a dilute solution of potassium permanganate. The latter, I have satisfied myself, gives equally good results with the bromine. It is absolutely necessary, in this process, as originally pointed out by Muck,\* that the combustion-tube should be washed out with water after the completion of the combustion, since sulphuric anhydride condenses in considerable quantity in the tube beyond the boat. It is further necessary, of course, to fume the residual ash with alkaline carbonate to determine the sulphur which has not been volatilized by the combustion.

I have in progress an interesting investigation on the effect of coking on the sulphur in coal, to determine what influence the nature of the sulphur—whether in combination with iron as pyrite or organically combined with the coal—has on its elimination in coking. These results must, however, be reserved for a future communication.

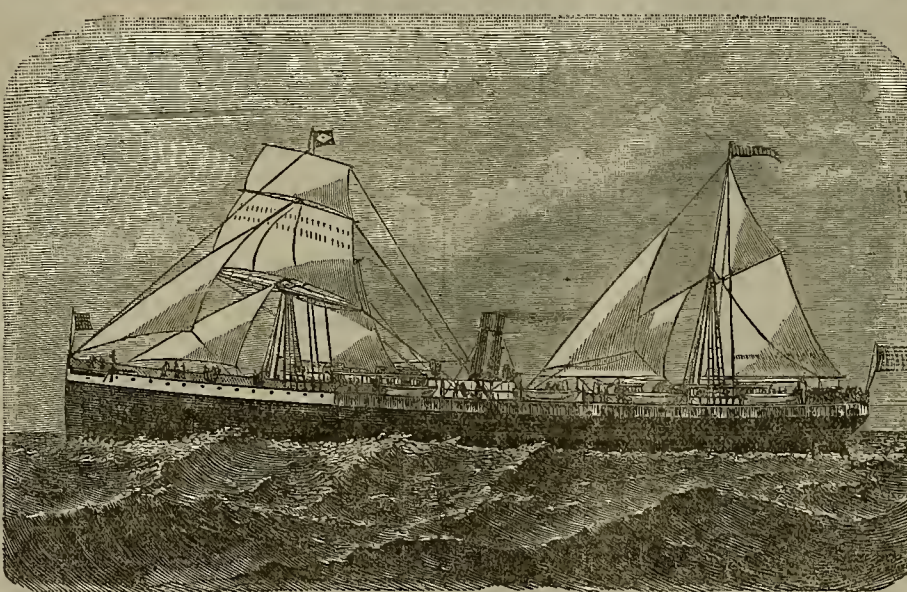
\*Fresenius, Zeitschrift, xiv, 16.

THE freezing of the water in the waste ditch of the Lundy reduction works, says the *Home Index*, has given so much trouble that it has been decided to substitute steam for water power during the winter months. An engine has been ordered, which will arrive in a few days. The ore worked so far has yielded a high percentage, and everything indicates that the process is an unqualified success.

THE Graphic says: Trouble is anticipated by gold and silver mining companies incorporated in this State. All dividends during the year preceding November 1st, 1880, which amounted to more than 6% on the nominal capital, will be subject to a tax of 1 mill for every 1% dividend. Under this law Chrysolite will have to pay \$27,500. Many other companies will have to pay a large tax.

COAL fields near San Antonio, Socorro county, N. M. T., are said to be awaiting only capital to bring rich development.

THE Con. Virginia mine spent for the C. & C. shaft alone last year the sum of \$14,093 for candles and \$16,975 for ice.



THE STEAMSHIP "STATE OF CALIFORNIA"

April 1, 1878, to October 1, 1880, with the appropriations of the same:

For 3 months ending July 1, '78.....	\$4,279.00
For 3 months ending October 1, '78.....	9,355.00
For 3 months ending January 1, '79.....	8,372.00
For 3 months ending April 1, '79.....	6,428.00
For 3 months ending July 1, '79.....	8,400.00
For 3 months ending October 1, '79.....	6,738.00
For 3 months ending January 1, '80.....	6,583.30

The above all went to the general fund of the city and county: With the year 1880 began the payments, according to law, to the Mining Bureau.

First quarter, to Mining Bureau.....	\$1,341.60
First quarter, to city and county.....	4,903.10
Second quarter, to Mining Bureau.....	3,920.60
Second quarter, to city and county.....	130.40
Third quarter, to Mining Bureau.....	3,622.70
Third quarter, to city and county.....	175.90

The total collections from July 1, 1878, to January 1, 1881, were \$64,201.10. The collections for the quarter ending January 1, 1881, are now being made.

### Stockton Mines, Utah.

The Great Basin mine is owned by a stock company, with Gen. P. E. Connor as managing director. This famous mine is situated on Mineral Hill. The average yield per day in this mine is about 25 tons of good merchantable ore, besides about 40 tons of jigging ore, with present facilities for hoisting. This can and will be greatly increased when the large combination shaft is completed, which is now down 80 ft., with its powerful machinery, which is now in progress of erection.

The company has, in close proximity, concentrating works which are in full blast. Eight tons per day can easily be run through the eight sets of jigging and concentrated. The supply of water is furnished by a four-inch galvanized pipe, which is laid for a distance of about six miles. The concentrating works are lighted by two electric lights, which are a great saving in such a large building. Besides the enormous length of four-inch pipe, there are 8,000 ft. of two and a half inch, laid from the

same operation may be repeated. It is necessary, however, that the mineral be very finely pulverized. Instead of using the pure bromine, a saturated solution of bromine in potassium bromide may be used with equally good effect.

The process is advantageously simplified by making a saturated solution of bromine in the concentrated alkali. This is done by pouring bromine into a solution of sodium hydrate of the above given specific gravity, until no more is taken up, and then adding a little of the sodium hydrate solution until the liquid does not give off free bromine. The procedure with this solution is as follows: The pulverized mineral is moistened with, say, 10 cc. of the solution, and heated, then hydrochloric acid added to just acid reaction. Two more additions of the alkaline solution, in amounts of 20 cc. each, are added at intervals of about 10 minutes, each addition being followed by hydrochloric acid. The total amount of alkaline solution (containing the bromine) used is, therefore, 50 cc., and the amount of hydrochloric acid should not exceed that necessary to make the solution acid after each addition of the alkali. The mixture should be kept hot. After the final addition of acid, the contents of the beaker is taken to dryness and heated in an air-bath to 100° to 115° C., to render silica insoluble. The dry mass is then taken up by hydrochloric acid and, after filtration, the sulphuric acid is precipitated by barium chloride. In a sample of copper pyrites Mr. F. E. Bachman obtained, in duplicate analyses, 34.05% and 34.12% sulphur; in zinc-blende 32.97% and 33.09%. In another sample of blende Mr. P. W. Shimer obtained 32.71%.

This method of determining sulphur I find especially valuable in the analysis of coal. By the treatment of coal as above described results are obtained which agree very closely. The coal, as such, is not attacked, and the sulphur obtained, therefore, represents that existing in the coal as pyrite, and also as soluble sulphates. The residue left by this treatment has been subjected again to the same process, and yields no



## The State Line Mine.

The Gold Mountain county, after lying apparently quiescent for a number of years, is just now looming into considerable prominence, on account of the extensive operations on the old State Line mine by a New York and Nevada company. From T. F. A. Connelly, who has just returned from Gold Mountain, we learn the following interesting points:

This mine is located in Nevada, about 7 miles from the eastern boundary line of this State, and is situated near the dividing line between Esmeralda and Nye counties, Nev. The route from Independence is via Big Pine and Deep Spring valley, thence to Lida valley and Gold Mountain—a distance of 115 miles. On an air line the State Line mine is a little north of east about 50 miles distant from Independence. If Gold Mountain is to have a boom, and a thriving mining town should grow up there—of which there seems but little doubt—we would urge our business men to investigate the practicability of building a road from the head of Mazurka canyon to that point.

About 150 men are now in the camp, some of them engaged in laying out a town, though a large majority are simply waiting for the company to commence active operations. But little work is being done at the present time, except grading for the mills. Some of the machinery is already on the ground, but it will probably be two months before enough has arrived, together with lumber, to commence building.

Two 40-stamp mills will be erected, on the same site. Water will be brought a distance of about 13 miles, the company having ordered 65,000 ft. of 6-inch iron pipe for this purpose. The cost of these works will be about \$80,000. Mr. J. M. Taylor is acting as manager for the company, and Dr. Garvin as superintendent. The company is said to have been organized in New York city, and over \$500,000 will be expended before any returns are expected. The round sum of \$100,000 was paid for the mine by the present owners. The State Line ledge is in a granite formation, and shows huge quartz croppings for a distance of about 100,000 ft. Five shafts have been sunk on the vein, to a depth varying from 15 to 80 ft. The ledge in the bottom of these shafts shows an average width of 11 ft. The ore is a healthy-looking, whitish quartz, streaked and spotted with iron oxide. The gold can be seen in some of the samples brought in, and probably a large percentage of that metal is in a free condition. Assays of the ore vary from \$10 to \$100 a ton, and the average is presumed to be about \$30. According to reported measurements there is now nearly \$2,000,000 worth of ore in sight in the mine, and there is every reason to believe that further development will show almost inexhaustible supplies for the mill.—*Inyo Independent.*

## California District, Arizona.

A correspondent of the *Arizona Citizen* writes from Galeyville as follows: The 19th of last October the first pick was struck on the most important mine of this camp. Tents and camp fires were scattered along each bank of Turkey creek, and although many people had mining locations all over the hills, made upon the appearance of croppings, which indicated a ledge, still none had commenced the work of development. Now, in the short time elapsed, the Texas company have opened up one of the finest mines in the Chiricahua mountains, and others in this district, profiting by their experience, have commenced working their prospects to as great an extent as their means will allow. Already many men of capital have turned their attention in this direction, and have made many investments, buying claims at a reasonable figure, which in every instance has proved a profitable investment for the purchaser.

The Texas mine is the only one which has been developed to any extent, and the developments on this claim have surpassed the expectations of even its owners. A shaft 120 ft. has been sunk, and drifts have been made at several places. A cut was made on the surface near the shaft, and from this three tunnels have been run in upon the ledge, and ore has been taken out from every excavation which has been made. A tunnel has also been started in the side of the hill, about 400 ft. from the mouth of the shaft, which will connect with the shaft at the depth of over 200 ft., so it is plain to be seen that the mine is situated upon a steep hill, and may be worked easily. The company also own several other claims, which are extensions of and adjacent to the Texas, which may prove equally as good when developed. A smelter has also been purchased, and in a short time will be in successful operation. About 700 tons of ore are upon the dump, which will work at least \$100 per ton, so success is already ensured, as the ore on the dump will more than pay for the mines and the smelter.

The property is owned principally by Pennsylvania men, who have already come to the conclusion that mining in Arizona is a decided improvement upon the oil business in their native State. A description of the many other claims upon which work is being done would require too much space.

A well organized company will thoroughly prospect the Santa Cruz mountains for coal deposits, commencing in the spring. It is the belief that large supplies of coal must lie contiguous to the oil regions of that section.

## USEFUL INFORMATION.

## Dyeing.

The following may be found useful in dye, chemical, or other works, to prevent vats from being spoiled by acid liquors, and the process can be usefully applied to wooden vats for fermentation. The vats or casks after having been dried in the air are reversed on a clear fire of red-hot cinders, and left there till the interior surfaces has become warm, when paraffine is applied by means of a brush; 2 lbs. of paraffine are said to be enough for a vat of 300 to 400 gallons. Fermentation vats treated by this method are said to be easily cleaned, and after two or three years' use they only require to be warmed internally to be useful again.

Very often the dyes of woolen cloths are blamed for the rubbing off of the pieces dyed in the indigo vat without reason, while in many cases this is caused by the ignorance of some fullers who perform the fulling on pieces which have not been perfectly washed previously. Every indigo-dyed piece after dyeing will hold some loose indigo which has not been fixed on the fiber, and which, if not removed by thorough washing, will in the fulling process with oil, soap and lime, form an insoluble compound which is very difficult to remove in washing afterwards. The pieces must, therefore, be washed before, and they must not be kept too long in the dirty soap water. Another cause of the rubbing is the soap itself, which is too often adulterated with starch, or has been manufactured out of inferior substances.

A NEW IMPLEMENT.—From *Design and Work* we take the description of a new implement called the Burgoyne which is a curious combination of tools required for use in military operations. The implement derives its name from the late Sir John Burgoyne, and consists of a spade and pick combined in one handle, the shape of the spade being determined by the consideration of a diversity of uses in largely different material. The spade in this particular implement is of a semi-circular form upon the edge or cutting point, is flat instead of being curved spoon fashion, and is claimed to be adapted for use as an ax, and can be readily used for cutting down hedges and undergrowth. The handle of this implement carries an auger, while the spade end, at will, can be turned by a little change into a balance blade, the other end of which is a pick with a single point. This pick point is also capable of being arranged in line with the handle for use as a crowbar, while another and novel use of it is in sticking the pick end into the ground, allowing the spade end or blade to be above the ground, behind which the soldier, lying upon the ground, uses a hole made in the spade end through which to shoot, his head being protected from direct fire by the blade of the spade. The description is an abstract of a paper read by Mr. Stewart Harrison to the London Volunteer Engineers.

TO DYE STRAW BLACK.—Add to a soda or potash lye a gluten solution (which has been left 24 hours to dissolve), and when the whole is well mixed filter and put the straw in the filtrate and leave for 12 hours. The straw loses its fatty substances and takes the dye better. When the straw is dry it is put into a solution of nitro-sulphate of iron and left for 12 hours and then taken out and dried. A decoction of logwood is now prepared, and the straw brought into it after some decoction of galls or sumach has been added. A small quantity of hichrome completes the development of the colors. For giving the necessary brilliancy to the straw use gum or gelatine, and rub with a woolen cloth and a little oil, then rub it again with a clean cloth to remove the oil.

LIGHT AND RESPIRATION OF SEEDS.—At a recent meeting of the French Academy of Sciences M. Panchon described his experiments on the influence of light on the respiration of seeds during germination. The experiments were made with the seeds of the castor-oil plant and haricot bean, and the general conclusions are established that for a given quantity of oxygen absorbed the seed placed in darkness exhales more carbonic acid than that kept in light, while in light there is always less carbonic acid exhaled than oxygen absorbed, the contrary being the case in darkness.

NEW WELDING PROCESS.—Krupp has recently taken out a German patent for a new process of welding tubes and tires. He draws the tube on a pair of ordinary rolls, and heats the whole length of the portions which are to be welded in a portable fire-hox, into which air is blown, so that the heat is directed against the weld. After the necessary heat is obtained, the rolls are set in motion, and the plate which is to be welded is repeatedly drawn through them.

CEMENTING LABELS TO METAL.—For attaching labels to tin and other bright metallic surfaces, first rub the surface with a mixture of muriatic acid and alcohol; then apply the label with a very thin coating of the paste and it will adhere most as well as on glass.—*Amateur's Handbook.*

EXPANSION AND CONTRACTION.—According to the researches of Prof. Quincke, the change of volume of solid and liquid bodies when subjected to electrical forces is not due to heat, the change of volume of fatty oils being one of contraction.

## Tanning in China.

The process of tanning in China is thus described: The skins are put into tubs containing water, saltpeter and salt. After 30 days they are taken out, the hair is shaved off, and the skins well washed in spring water. Each hide is then cut into three pieces and well steamed, which is done by passing them several times backward and forward over a steaming oven. Further, each piece is stretched out separately over a flat board, and secured with nails, in order that it may dry gradually and thoroughly in the sun. The smoke of the oven makes the leather black, and if it is required to give it a yellow appearance it is rubbed over with water in which the fruit of the so-called wongchee tree has been soaked. Of the offal, glue is made by heating it in pans for 12 hours over a slow fire. The glue so obtained is poured into rough earthen vessels, where it remains three days in order to coagulate. The solid mass is cut into pieces with sharp knives, and carefully laid upon grating-like trays to dry, which are placed in open spaces, resembling the Dutch threshing floors. The time taken in drying varies according to the season of the year; with a northwest wind it will be about five days only, but with a southwest wind as many as 30 or 40 days will be required. The dregs from the offal left in the pans, as well as the hair from the skins, are sold to the farmers for manure. At Oak-sha, a village near Canton, there is an extensive establishment for the manufacture of leather, which is well worth a visit. The Mongols in wild parts of the country make clothes from goatskins, which are excellent and durable protection against cold and wet. When the hair is taken from the skins, carpets and mats are made from the latter.

## GOOD HEALTH.

## Eating When Exhausted.

When the strength of nerve power is already worn out or used up, the digestion of food only makes a fresh demand upon it, and if it is unable to meet the demand the food is only a burden upon it, producing mischief. Our bodies have been compared to steam engines, the food being the fuel and the steam produced the nerve power. The analogy holds good to a certain extent. If, when the steam is low, because the fire is low, you pile in too fast a quantity of coal, you put out your fire, and if you have depended upon steam power to run your fires, that is also extinguished.

Beyond this the comparison fails. You may clean out furnaces again, but in the body the consequences of this overloading are dangerous, and sometimes fatal. No case of cholera is more common than eating freely when exhausted.

The rule should be to rest for a time, and take some simple refreshment, a cup or part of a cup of tea, a little broth, or even a piece of bread, anything simple and in small amount, just to stimulate the stomach slightly, and begin to restore its power. After rest, a moderate quantity will be refreshing.

Never eat a full meal when you are exhausted. Take first a small quantity of anything simple, which may be handy, and rest. Then after a time proper food will be a blessing, not a burden. The fires will burn, the steam will be up, and you can go on safely.

It is not amiss in this connection to say that children would avoid many a feverish night, and many an attack of distress, if mothers would follow this rule.—*Exchange.*

EFFECTS OF BREATHING OXYGEN.—A young Frenchman, M. Aune, has lately made experiments on himself relative to this question, which he has chosen as the subject of a medical thesis. The experiments lasted four weeks, during which time he submitted himself to a uniform regime as regards quantity and quality of food, muscular exercise and intellectual work. He took oxygen only during the second and the third week, inhaling between 40 and 80 liters of it daily, but during the whole time he made a careful record of temperature, pulse, respiration, etc. The conclusions arrived at are briefly as follows: Inhalation of oxygen made under physiological conditions does not cause any inconvenience. One may absorb 100 liters, and even more, daily. Oxygen increases the appetite, and develops the functions of assimilation; and on this account it tends to increase the weight of the body. It produces a slight intoxication, and tingling sensation in the extremities. It raises the temperature very slightly. Under its influence the respiratory movements and the pulsations become more numerous. Oxygen has an incontestable action on certain elements of the blood; it increases the number of red corpuscles and of hemoglobins, and the richness of the former in hemoglobin. It has no influence on the white corpuscles. M. Aune did not experience that sensation of heat in the chest of which some authors have spoken in connection with this subject. Commenting on M. Aune's experiments, M. Hoyer remarks that the effects are only temporary, and that while inhalation of oxygen may be of service through favoring assimilation, it could not be made a definite treatment, and it would be necessary always to administer iron in addition. The inhalation gives very good results in the case of dyspeptic phenomena and obstinate vomiting.

## The Spread of Diphtheria.

The unusually large number of cases of diphtheria, occurring both on this coast and at the East, calls for especial care and intelligence in preventing the generation and spreading of this terrible disease. The following statement of the symptoms of the disease, and the precautions to be taken where it prevails, is being distributed by the Health Department of New York. Everybody should read it and attend to its warnings.

Cleanliness in and around the dwelling, and pure air in living and sleeping rooms are of the utmost importance where any contagious disease is prevailing, as cleanliness tends both to prevent and mitigate it. Every kind and source of filth around and in the house should be thoroughly removed; cellars and foul areas should be cleaned and disinfected; drains should be put in perfect repair; dirty walls and ceilings should be lime-washed, and every occupied room should be thoroughly ventilated. Apartments which have been occupied by persons sick with diphtheria should be cleansed with disinfectants, ceilings lime-washed, and wood work painted; the carpets, bed clothing, upholstered furniture, etc., exposed many days to fresh air and the sunlight (all articles which may be holed or subjected to high degrees of heat should be thus disinfected); such rooms should be exposed to currents of fresh air for at least one week before reoccupation.

When diphtheria is prevailing, no child should be allowed to kiss strange children nor those suffering from sore throat (the disgusting custom of compelling children to kiss every visitor is a well-contrived method of propagating other grave diseases than diphtheria); nor should it sleep with or be confined to rooms occupied by or use articles, as toys, taken in the month, handkerchiefs, etc., belonging to children having sore throat, croup, or catarrh. If the weather is cold, the child should be warmly clad with flannels.

When diphtheria is in the house or in the family, the well children should be scrupulously kept apart from the sick in dry, well-aired rooms, and every possible source of infection through the air, by personal contact with the sick, and by articles used about them or in their rooms, should be rigidly guarded. Every attack of sore throat should be at once attended to; the feeble should have invigorating food and treatment.

The sick should be rigidly isolated in well-aired (the air being entirely changed at least hourly), sunlighted rooms, the outflow of air being, as far as possible, through the external windows by depressing the upper and elevating the lower sash, or a chimney heated by a fire in an open fireplace; all discharges from the mouth and nose should be received into vessels containing disinfectants, as solutions of carbolic acid or sulphate of zinc; or upon clothes, which are immediately burned, or if not burned, thoroughly boiled or placed under a disinfecting fluid.

## Hints for Bathers.

According to the *London Lancet*, it is important to recognize that the only virtues of water as used by the bather are two—namely, its value as a cleansing agent, and as a surface stimulant. In this last capacity it simply acts as a medium affecting the temperature of the part to which it is applied, or which is immersed in it. Right views of fact in reference to this matter are important because there can be no question that some persons overrate the uses of cold water, and run considerable risks in their pursuit of them. Every beneficial action that can be exerted by a bath is secured by simply dipping in the sea, or a very moderate affusion of cold water! Except in cases of high fever, when it is desired to reduce the heat of the body by prolonged contact with cold, a bath of any considerable duration is likely to be injurious.

Then, again, it is necessary to recognize the risk of suddenly driving the blood from the surface in upon the organs. The "plunge," or "dip," or "shower," or "douches," is intended to produce a momentary depression of the temperature of the surface in the hope of occasioning a reaction which shall bring the blood back to the surface with increased vigor, and almost instantly. If this return does not take place; if, in a word, redness of the skin is not a very rapid consequence of the immersion, it is impossible that the bath can have been useful, and in nine cases out of ten when the surface is left white or cold, it does harm. The measure of value is the redness which ensues promptly after the bath, and this reaction should be produced without the need of much friction, or the bath is not worth taking. The rubbing employed to recover the circulation lost by the bath would probably have done more good without it!

Another effect of the bath when it acts properly is to stimulate the nervous system, through the vast series of its terminal fibers which are distributed in the skin. In this way, also, the action must be very rapid, or it is not efficacious. Unless the vigor of energy is quickly called out the agent is useless; and if it produces either drowsiness or depression it acts mischievously and lowers the power it is intended to stimulate and augment.





W. B. EWER.....SENIOR EDITOR.

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## SAN FRANCISCO:

Saturday Morning, Jan. 29, 1881

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MISCELLANEOUS.—Our Coast Steamship Trade; Underground Survey; Licenses, Collections and Mining Stock Certificate Tax; Stockton Mines, Utah; Sulphur in Sulphides and in Coal and Coke, 70. The State Line Mine, 71. Tombstone District; Mining in Maine, 74. NEWS IN BRIEF, on page 77 and other pages.

## The Week.

The Legislature is still in session at Sacramento, but so far has not accomplished very much in passing bills, although many have been brought before it.

We give this week our usual annual mining review, which occupies the principal portion of the space on our editorial pages. This review will be found to contain statistics valuable for reference, and a great deal of information worthy of perusal. It is impossible to make it otherwise than general in its nature, since the mining field has become so very much extended during the last two or three years. We have given from time to time all the detailed current news from the various mines, and this article only summarizes the results of the year.

It seems proper in this place to call the special attention of our readers to the merits of the PRESS. We aim continually to progress in our work, and spare no pains in getting all the latest information to our subscribers. We have recently made arrangements by which we will be able to present more engraving than formerly, and shall make a feature of illustrating all the new mechanical devices connected with mining and metallurgy.

A MEMORIAL to Congress by citizens of Los Angeles, relative to the harbor at Wilmington, sets forth that when the work was commenced there was but 18 inches of water over the bar at low tide. Now there is ten ft. In 1855 the business of the port was but 6,000 tons. Last year it was 110,000. The memorial asks for \$200,000, which according to the report of the Government Engineer, will be sufficient to deepen the channel over the bar to 17 ft. A resolution was passed, asking the Legislature to adopt a concurrent resolution endorsing the memorial.

The Assessor of Washoe county, Nevada, reports 14 irrigating ditches, aggregating 124 miles in length, and irrigating 13,800 acres. There are two railroads—77.15 miles—assessed at \$694,550; five wood flumes, 44 miles. Of the land in the county, 23,400 acres are agricultural, 206,400 grazing, 41,201 timber, and 92,160 mineral.

## Mines and Mining in 1880.

In accordance with our custom, in this month of the year, we present a cursory review of the progress of the mining industry for the previous year. Formerly, it was possible for us to enter into great detail concerning not only counties and districts, but prominent mines. California and Nevada so far overshadowed Montana, Idaho, Colorado and Utah, that the principal mining interest centered in the first mentioned States. Now all of them are large bullion producers, and to them are added Arizona and New Mexico. Moreover, Nevada has fallen from its place at the head of the list as a bullion producer to the third, California still keeping the second place. Colorado has jumped to the first place this year, its Leadville output having been very large. If the production of that camp can be kept up, Colorado will remain for a few years in the lead, unless the old Comstock should again vouchsafe to us another bonanza, when, no doubt, Nevada would take its old place again.

Speaking generally, the result of the year's work in 1880 was very encouraging, but it was not up to what was expected. Some of the new camps in Arizona and Colorado, about which we heard so much, did not give the dollars and cents to prove their great superiority. In truth, they were "hoomed" too soon. No mining camp is made in a day. Nor is the fact that several dozen companies are organized with big capitals, on paper, any guarantee of the existence of good mines.

Californians have always been reproved for their tendency to form joint stock companies, and until the past two years San Francisco was the center of mining stock transactions of this coast. The center of such transactions has been transferred to New York, and now all the Eastern people view such things in a different light. One of the great evils of the past year has been the miscellaneous stocking of all sorts of mines and the indiscriminate sale of stock. In fact, in many instances, it looked as if the only reason for forming the companies was to sell stock. Hundreds and hundreds of companies have been organized all over the coast during the past year, but most of them were organized in Colorado and Arizona, and the stock taken to New York.

Now a misapprehension exists as to the California stock companies. The lists called each day at the Stock Exchange in this city, until within the past year or two, did not include half a dozen California mines. When Bodie district came to the front, a lot of the mines of that district were listed; but before that, most of the mines were those of Nevada, with a few of Utah, Idaho, and half a dozen California. The mines of this State are worked more on legitimate enterprise than stock jobbing operations. So, although San Francisco people deal in mining stocks, they do not trade in their own mines on that account. We make these remarks to correct an impression we know to prevail in certain quarters, that California mining interests are languishing on account of the dullness of the mining share market.

## The Bullion Product.

It has been the custom to accept the figures of the bullion production for the year as indicating the progress of the mining industry. No better standard could probably be taken than this, as "coin talks," and we hear through the newspapers most exaggerated statements of mining camps and mines that in the end amount to comparatively nothing. If the figures, based on estimates of the various local journals, were added up, the aggregate bullion product would be apparently quadrupled to say the least.

Wells, Fargo & Co., who transport most of the bullion, report that the product of the precious metals in the States and Territories west of the Rocky mountains for 1880 is \$30,168,000, while last year it was but \$75,349,500. In 1880, the gold produced was \$33,522,200; the silver, \$40,005,400; the lead, \$5,742,400, and the copper, \$893,000. It will be noticed that silver forms within a fraction of 50% of the entire total, and gold is 41% of the total.

As we have said before, Colorado has stepped to the front as the principal bullion producer. She has had first rate opportunities, since capital has flowed into her borders for the past two years, while all other parts of the country have been comparatively neglected. The first place California used to hold, until placer mining began to give out, and the silver mines began to be developed, when Nevada took the lead and maintained it for several years. Colorado is now in the van, but it would be no great surprise if, in the near future, Utah, Arizona or Dakota did not become the leading bullion producing district of the country. These Territories have made rapid strides during the past two years, particularly the last named two. Four years ago Dakota was unknown as a bullion producer. It appears on the list for 1877 for the first time, when it is credited with \$1,500,000. Last year it produced over \$4,000,000, and has two or three fine dividend-paying properties. Four years ago Arizona was credited with a product of \$1,112,000, while last year the yield was nearly \$4,500,000. Utah has been a larger producer in the past five years than Arizona or Dakota. In 1876, Utah was

credited with a product of \$5,207,500. In the following year, this product rose to \$8,113,800, but in 1879, it was less than \$5,500,000, while last year it rose to \$6,451,000.

We have published Wells, Fargo & Co.'s statement in full, and now repeat the tables which accompany it.

Statement of the Amount of Precious Metals Produced in the States and Territories West of the Missouri River, Including British Columbia, (and Receipts in San Francisco by Express from the West Coast of Mexico,) During the Year 1880.	
States and Territories.	Gold Dust and Bullion by Express.
California.....	\$16,937,745
Nevada.....	2,268,733
Idaho.....	62,911
Washington.....	1,775,115
Montana.....	1,115,767
Utah.....	2,275,553
Arizona.....	27,300
New Mexico.....	3,149,081
Dakota.....	159,970
British Columbia.....	676,946
Total.....	\$27,924,866
Gold Dust and Bullion by other conveyances.	
California.....	\$345,000
Nevada.....	34,200
Idaho.....	235,000
Washington.....	10,356
Montana.....	1,036,000
Utah.....	1,036,000
Arizona.....	1,036,000
New Mexico.....	1,036,000
Dakota.....	1,036,000
British Columbia.....	1,036,000
Total.....	\$2,149,833
Silver Bullion by Express.	
California.....	\$1,071,992
Nevada.....	20,874
Idaho.....	32,772
Washington.....	919,189
Montana.....	1,076,775
Utah.....	1,076,775
Arizona.....	1,076,775
New Mexico.....	1,076,775
Dakota.....	1,076,775
British Columbia.....	1,076,775
Total.....	\$2,608,613
Silver Bullion by Freight.	
California.....	\$1,811,854
Nevada.....	323,306
Idaho.....	1,036,611
Washington.....	1,036,611
Montana.....	1,036,611
Utah.....	1,036,611
Arizona.....	1,036,611
New Mexico.....	1,036,611
Dakota.....	1,036,611
British Columbia.....	1,036,611
Total.....	\$8,113,800
Total.	
Gold.....	\$38,278,166
Silver.....	15,031,611
Lead.....	1,036,611
Copper.....	893,000
Total.....	\$55,207,500

In addition to the above table, Mr. Valentine, general superintendent of the Express Co., gives the following table, showing the annual product for the past 10 years.

Annual Products of Lead, Silver and Gold in the States and Territories West of the Missouri River, 1870-1880.	
Year.	Product as per W. F. & Co.'s Statements, from British Columbia and West Coast of Mexico.
1870.....	\$94,000,000
1871.....	68,834,000
1872.....	55,784,000
1873.....	72,438,000
1874.....	74,019,000
1875.....	80,999,000
1876.....	90,076,000
1877.....	87,219,500
1878.....	87,219,500
1879.....	87,219,500
1880.....	87,219,500
Total.....	\$742,312
Product after deducting Amounts from British Columbia and West Coast of Mexico.	
1870.....	\$52,150,000
1871.....	40,351,824
1872.....	33,784,000
1873.....	47,684,302
1874.....	51,656,610
1875.....	57,703,433
1876.....	57,703,433
1877.....	57,703,433
1878.....	57,703,433
1879.....	57,703,433
1880.....	57,703,433
Total.....	\$488,000
The Net Product of the States and Territories west of the Missouri River, exclusive of British Columbia and West Coast of Mexico, divided, is as follows:	
Lead.....	\$1,080,000
Silver.....	15,031,611
Copper.....	893,000
Gold.....	\$38,278,166
Total.....	\$55,207,500

Of the product of the last 11 years, as reported by Mr. Valentine, \$29,715,000 was from British Columbia and Mexico. The average yield, including this foreign bullion, has been \$75,276,000 per annum. The yield last year was nearly \$5,000,000 above this average. The domestic bullion product shows an average of \$72,575,000 per annum for the past 11 years. The gold product for 1879 was the smallest in 11 years. It was the largest in 1877, when the total was \$14,880,200. The silver product was increased from \$17,320,000 in 1870 to \$45,846,000 in 1877. The domestic product of the Ter-

ritory under consideration during the past 11 years shows the following description:

Gold.....	\$413,330,300
Silver.....	\$42,801,200
Lead.....	41,285,400
Copper.....	808,000

Total.....\$798,323,900

Of the \$756,140,200 in gold and silver produced by the domestic mines on the Pacific coast in the last 11 years, nearly 55% was in gold, and of course over 45% in silver. During the past year these relations have been reversed. Silver formed nearly 54% of the domestic product for 1880, while gold of course was only a fraction over 46%.

## Dividends.

Although the figures showing the product of the mines in the aggregate are taken as a basis for comparison of annual product, and as a measure of the standard of prosperity, the figures showing the dividends cannot be taken as a standard of the prosperity of the various mines. Some mines may be paying dividends and running out of ore; or paying dividends without any ore, as frequently happens. Others not paying dividends may be opening up ore reserves or procuring machinery or making an important shaft or doing one of a dozen things.

Still people always want to know how the dividends have been distributed, taking their totals as indicating a prosperous or disastrous year. The San Francisco Bulletin has given carefully compiled statistics, showing the dividends of 1880.

Twenty-seven mines, either organized under the laws of California or owned by California capitalists, paid dividends during the year. Some of these have paid only one dividend, and one paid sixteen. Twelve of the mines are in California, eight in Nevada, four in Dakota, two in Arizona and one in Utah. These are not the only mines that have paid dividends during the year in these States and Territories. Others have made their distributions principally, if not solely, at New York, Boston, Philadelphia and London. Some of those paying at San Francisco have also paid at New York and Boston. Following is a detail list of the dividends:

Mines and Localities.	No.	Amount.
Argenta, Elko Co., Nev.....	1	\$30,000
Black Bear, Siskiyou Co., Cal.....	5	45,000
Bodie Con., Mono Co., Cal.....	3	100,000
Con. Virginia, Storey Co., Nev.....	2	540,000
Deadwood, Lawrence Co., D. T.....	11	275,000
Deadwood-Terra, Lawrence Co., D. T.....	1	50,000
Eureka Con. Eureka Co., Nev.....	12	250,000
Excelsior W. & M., Yuba Co., Cal.....	9	275,000
Father de Smet, Lawrence Co., D. T.....	7	210,000
Fresno Enterprise, Fresno Co., Cal.....	3	75,000
Grand Prize, Elko Co., Nev.....	2	50,000
Great Western Quick, Lake Co., Cal.....	1	12,500
Golden Terra, Lawrence Co., D. T.....	3	75,000
Homestake, Lawrence Co., D. T.....	16	490,000
Indian Queen, Esmeralda Co., Nev.....	1	6,000
Idaho, Nevada Co., Cal.....	12	127,100
Napa Con. Quick, Napa Co., Cal.....	9	40,000
Natoma W. & M., Siskiyou Co., Cal.....	3	15,000
New York Hill, Nevada Co., Cal.....	7	67,000
Northern Belle, Esmeralda Co., Nev.....	8	200,000
North Belle Isle, Elko Co., Nev.....	1	15,000
North Bloomfield, Nevada Co., Cal.....	1	45,000
Ontario, U. T.....	12	600,000
Ophir, Storey Co., Nev.....	1	100,800
Silver King, Plinal Co., A. T.....	3	75,000
Standard Con., Mono Co., Cal.....	13	925,000
Watt Blue Oval, Nevada Co., Cal.....	1	7,000
Western, A. T.....	7	525,000
Totals.....	155	\$5,233,900

The locality of the mine distributing the above amount to stockholders during the past year is indicated in the following table:

Mines.	Dividends.
California.....	\$1,732,100
Nevada.....	1,211,800
Dakota.....	1,000,000
Arizona.....	600,000
Utah.....	600,000

Totals.....\$5,233,900

In 1870.....\$5,233,900  
In 1879.....6,675,000

During the year 1878 the mines distributed \$18,234,700, but \$13,500,000 of that amount came from the California and Con. Virginia mines. This year the California does not appear in the dividend list, and the Con. Virginia paid only \$540,000. In addition to the California dividends for the past year, mentioned above, it is known that two or three mines in Plumas county, organized under the laws of New York, have paid several dividends at New York; also two California gold mines, and one Nevada silver mine, operated with English capital, have paid dividends at London. The Star-Grove mine of Nevada, incorporated at New York, has paid two dividends of \$20,000 each at New York during the past two months. The Tomhetone mine in Arizona, near the Western, has paid nine dividends of \$50,000 each at Philadelphia this year. There have also been several Utah mines, besides Ontario, that have paid dividends at New York this year. The Barbee & Walker and Stormont mines at Silver Reef are paying dividends. The former is paying 26% per annum, and the latter 32%. The Christy mine, of Utah, owned in this city, and worked as a clove corporation, has been producing from \$25,000 to \$30,000 per month right through the year, and we presume it has quietly divided considerable money among its few owners. The Green Mountain, La Plata and Rising Sun are also mines paying dividends. We know of some private gold claims in California, owned in this city, that have done the same thing. There are dozens of drift and gravel mines in this State paying dividends every month which do not appear in these tables, as they are owned by private companies, and their assets are not made public.

## Assessments.

The assessments levied last year were not paid with a very gratifying promptness in the



case of those mines which were suspected of being more in the line of stock jobbing operations than legitimate enterprises. The journal from which we took the above, also publishes a list of the mining companies which levied assessments in 1880. The list is very long, and covers 249 claims in California, Nevada, Idaho, Utah, Arizona, Dakota, Lower California and Mexico. As it takes at least two months to go through all the legal forms of an assessment, it is impossible for any company to get in more than six during a single year. Only one company succeeded in doing this during the past year. Sierra Nevada leads in the aggregate amount, having called in \$1,000,000, the largest amount collected by any single mine in three years.

There were 470 assessments, aggregating \$13,142,000. The list embraces 112 California mines located in 21 of the 52 counties of the State. Mono county gets \$1,918,900, and other counties nearly \$1,000,000, as follows:

CALIFORNIA.		
Counties.	No.	Amount.
Mono.	40	\$7,918,900
Placer.	10	206,200
Nevada.	11	174,500
Inyo.	2	155,000
Anaconda.	3	83,000
Sierra.	3	75,000
Butte.	6	67,000
Mariposa.	1	45,000
Calaveras.	6	31,000
Yuba.	2	23,000
San Bernardino.	1	27,500
El Dorado.	5	25,000
Tuolumne.	3	23,000
Plumas.	1	13,500
Del Norte.	3	10,000
Shasta.	2	9,000
Trinity.	2	5,000
Tulare.	1	5,000
Fresno.	1	3,000
Tehama.	1	3,000
Alpine.	1	2,000
Totals.	112	\$2,900,000

Nevada is the great absorbent of assessment money, the Comstock lode, which runs through Storey county, taking the lion's share. That State has made the poorest returns this year for the amount of money expended of any of the mining fields under consideration. Following is the apportionment:

NEVADA.		
Counties.	No.	Amount.
Storey.	61	\$7,789,900
Esmeralda.	13	552,500
Eureka.	6	237,500
Kiko.	9	235,000
Lincoln.	3	190,000
White Pine.	4	160,500
Nye.	4	132,500
Ormsby.	1	25,000
Humboldt.	1	10,000
Lander.	1	9,000
Lynn.	2	87,000
Total.	105	\$9,381,900

Arizona has developed one dividend mine this year that has given back more than the 18 mines in the annexed list have collected:

ARIZONA.		
Counties.	No.	Amount.
Yavapai.	4	\$100,000
Pinal.	3	99,000
Mohave.	2	65,000
Yuma.	2	13,000
Maricopa.	2	11,000
Total.	18	\$378,000

Utah has been very moderate in its demands. Its importance as a mining field was never so well understood as it has been during the past year. Here is the list of assessments:

UTAH.		
Counties.	No.	Amount.
Washington.	1	\$21,000
Juan.	2	15,000
Little Cottonwood.	1	8,000
Total.	4	\$44,000

Most of the money for Dakota was collected by the Caledonia Mining Co. The mine is said to show good prospects of returning the outlay. There are three dividend-paying mines in Dakota. Idaho has made only one call for aid this year through the Florida Co. There are two mines in Lower California and two in Mexico that have levied assessments in this city during the year. The apportionment of assessment money for these miscellaneous sources for the past year has been as follows:

MISCELLANEOUS.		
Orgs.	No.	Amount.
Dakota, Lawrence Co.	5	\$345,000
Idaho, Owyhee Co.	1	10,000
Lower California.	2	17,500
Mexico.	2	65,000
Totals.	10	\$437,500

The grand total of mines assessed and money collected compares as follows:

	No.	Amount.
1880.	470	\$13,142,000
1879.	514	14,827,700
1878.	422	13,951,500

Of the assessments levied this year, not over 50% was paid in. In many cases the collections were not sufficient to pay the cost of advertising the assessment and delinquent notices.

#### California.

We have, each week, during the past year, given such close and detailed accounts of the various localities and mines in this State, that it is scarcely necessary in this review to make other than general statements. We have kept close track of the progress and development of the California mines, and those of our readers interested in any particular one, cannot fail to have noticed that we have as often as occasion offered, given the current news concerning it. We have, moreover, from time to time given such general views of the general progress of our most important industries as seemed to reflect the facts connected with it.

California has shown this year an increase of bullion production. This fact has surprised

some few persons, who saw no reason for her to do so. The truth is, too many persons have their opinions on mining matters from the state of the mining stock market in San Francisco. They thought that because mining stocks were not "booming" there was, therefore, a corresponding depression in the mining interests of California. There could be no greater mistake. California mines are not called in the stock boards, if we except those of Bodie. The gravel and drift mines of this State produce from \$14,000,000 to \$15,000,000 per year, yet there is not a single one quoted on our stock markets.

The reasons for an advance in the bullion product are plain. Men are pitching into work more cheerfully. All over the State we hear of two, four, six or eight men at work on claims of their own. Many old abandoned claims which would not pay to work under the old system of high wages and extravagant expenditure of all kinds, have been relocated by industrious men and properly developed. In most of the counties of the State one may now see arastras at work here and there. The poor man's mill is the best possible thing for a gold country. It is cheaply built, cheaply run, easily managed, and does its work well. It will build up a country better than 10-stamp mills, because with its small properties can be developed by few men. The mill requires a big mine, big company and increased expenses. Where, however, the arastra is seen at work, there we know the mine belongs to a few men who are working it in their own interests, and not for wages.

Although large companies with extensive works, employing a hundred or more hands, advertise a camp more than anything else, a few dozen small companies of industrious men will develop the country better. Working miners, laboring on their own mines form part of a permanent population; miners who work for wages become more or less nomadic in their habits, build no abodes for themselves and cannot be said to have that interest in the country that they would have as owners of claims.

The principal quartz mining centers in the State are at Grass Valley and Nevada City, Nevada county and Bodie, Mono county, and probably a few facts concerning each will illustrate the state of the industry.

#### Grass Valley and Nevada City

Are about four miles apart, each being in the center of a district bearing the respective names given. Grass Valley mining district is one of the richest gold producing regions in the world. The operations there are principally confined to quartz that being the point where quartz mining was first begun on the coast. It is in Grass Valley township that we find such mines as the New York Hill, Idaho, Rocky Bar and a host of others large and small.

Some facts concerning the Nevada City district, which we take from the *Transcript*, will be of interest. This district is about four miles long and three wide, Nevada City being near the center. The mines are situated in granite and slate formations, as well as on the contact between them. The granite extends from a mile west of Nevada City to three miles east, the slate being to the east and west of these points. Many of the chutes are found to be rich at the surface, but are usually the best and strongest in the lower workings of most of the mines. The lodes average from two to four ft. in thickness. The ore is composed of quartz and sulphurets. The yield in free gold is from \$12 to \$60 a ton, although much "specimen rock" is found that will pay as high as \$20,000 a ton. The ores pay from one to four per cent. of their gold value in silver. The gold is worth, as it comes from the mills, from \$16 to \$18 an ounce. Sulphurets pay from \$100 to \$1,000 a ton, averaging from \$150 to \$250. The best mines in the district are from 300 to 1,000 ft. deep, and all of them are holding their own, while some are improving, as sinking progresses. After a mine is properly opened ore can be extracted for from \$2 to \$5 a ton. An ordinary mill-stamp will crush from 1½ to 2½ tons of ore per 24 hours, at a cost varying from \$1 to \$2 a ton. Mining and milling should ordinarily be done for from \$5 to \$7 per ton. Sulphurets can be reduced by the chlorination process at from \$16 to \$20 a ton. The Providence and Merrifield mines have extensive chlorination works of their own, and there are two custom works—Maltman's and the Pioneer.

The cost of labor at Nevada City, in working the mines, is as follows: Unskilled workers receive from \$2 to \$2.50 per day of 10 hours; miners, in most claims, \$3; millmen and engineers, \$3 to \$4; mechanics, \$3.50 to \$4. Millmen and engineers sometimes work 12-hour shifts. A large portion of the mines work three eight-hour shifts.

In 1878 the bullion shipments from Nevada City by Wells, Fargo & Co., amounted to \$1,207,000; in 1879, to \$1,292,762; in 1880, \$1,267,252. It is estimated that of the above total about one-third was from quartz and the remainder from gravel claims. It does not represent the entire amount of bullion shipped to Nevada City, as a number of prominent mine owners send their product away through other mediums of transportation.

In Grass Valley district, is situated the well known Idaho mine, which may be considered as one of the representative gold mines in this State. We give some figures concerning this mine from the last annual report, as it will give readers a broad idea of the expense of running such a mine.

After an expenditure of about \$90,000 on the property the Idaho mine commenced paying

dividends in 1869, and with but few intermissions has paid regular monthly dividends ever since, the total number of such being 136, amounting to \$2,830,300, out of a total yield in the twelve years of \$6,140,183 02. The yield of the past year has been \$440,445 59, out of which dividends to the amount of \$127,100 have been paid.

There has been paid out in dividends to the stockholders as follows:

	Div.	Per cent.	Am't.
1869	11	55	\$170,500
1870	7	12	31,200
1871	11	15	232,500
1872	11	12	162,750
1873	12	22	683,000
1874	11	10	137,750
1875	11	55	172,050
1876	12	82	235,750
1877	12	77	240,250
1878	12	85	168,550
1879	12	51	127,100
1880	12	41	127,100

Being for 12 years 136 dividends, aggregating 913 per cent. on the capital stock, and amounting to \$2,830,300.

The ore worked during the year amounted to 28,072 tons. Of this amount 6,270½ came from the 800 level; 134½ from the 900 level; 6,051½ from the 1,000 level; 14,776½ from the 1,100 level; and 739 from the 1,200 level. This gave a yield of—

24,457 ounces of bullion.	\$426,939 46
68 tons of slime sold.	1,252 00
Est. cost working same.	1,005 00
Tailings worked on shares.	5,508 12
321 tons tailings sulphurets.	4,589 72
50 tons of bulidie sulphurets.	4,317 36
Sold 10½ tons sulphurets.	689 85
Est. cost of working same.	202 50
Specimens sold.	65 00

Total. \$444,118 69

Yielding an average of \$15.82 per ton; average cost of milling per ton, \$9.29½.

Following is a table of expenses for the year:

Milling, mining, repairing.	\$280,611 43
Grinding tailing out per ct.	1,233 17
Exhaust fan for air shaft.	425 00
Iron hobs for underground.	719 00
Three plank poles and castings.	1,225 00
Steam capstan.	1,646 54
Sinking incline.	4,496 00
Prospecting on 1000 level and crosscut.	1,578 25
General account.	12,821 62
Saving sulphurets.	2,542 50

Total expenses. \$290,795 61

This statement is only given to illustrate the operations of a representative California gold mine.

#### Bodie.

In Bodie district, which last year was "booming," times have been dull this year. A great many mines shut down, and many miners left. And this notwithstanding, the district produced \$3,636,699 13 in 1880, an excess of over half a million over the figures of 1879, and of nearly three millions over those of 1878, when the Bodie "boom" was at its height.

The agent of Wells, Fargo & Co., at Bodie, furnished the following figures of the production of that camp for the periods stated:

SHIPMENTS IN 1877.	
Standard.	\$794,322 60
Mexican, Red Cloud and Kate Rogers.	12,000 00
Total.	\$797,022 60
SHIPMENTS IN 1878.	
Standard.	\$1,025,883 35
Mexican.	1,042,336 50
Bechtel.	58,634 93
Red Cloud.	1,927 50
Scattering.	1,550 00
Total.	\$2,129,732 58
SHIPMENTS IN 1879.	
Standard Con.	\$1,448,845 47
Bodie Con.	784,057 12
Bulwer Con.	241,094 38
Noonday.	35,532 29
Syndicate.	12,815 38
Bechtel.	11,506 85
Sitting Bull.	3,485 09
Shipments by banks.	36,000 00
Total.	\$2,556,847 58
SHIPMENTS IN 1880.	
Standard Con.	\$1,878,763 46
Noonday and North Noonday.	511,757 21
Bodie Con.	429,517 80
Bulwer Con.	117,493 31
Belvidere.	25,901 25
Syndicate.	21,517 76
Dudley.	1,745 06
Scattering.	93,445 25
Total.	\$3,063,699 13

#### Comparison.

The following is a comparison, by months, for the past three years:

	1878.	1879.	1880.
January.	\$111,567 97	\$201,405 25	\$193,713 15
February.	84,475 50	136,714 44	1,131 43
March.	73,449 77	193,404 46	266,053 00
April.	76,613 33	208,541 34	231,057 71
May.	62,026 15	145,348 20	265,153 12
June.	85,912 84	302,855 79	265,277 00
July.	110,075 79	172,613 21	243,835 56
August.	693,944 33	212,013 30	235,673 53
September.	317,008 63	236,238 38	218,391 90
October.	170,338 36	193,249 33	257,114 84
November.	124,020 69	195,981 23	244,769 81
December.	209,323 31	275,201 25	325,128 73
Scattering.		33,000 00	33,445 26
Total.	\$2,129,732 58	\$2,556,847 58	\$3,063,699 13
Increase in 1880 over 1879.			506,851 55
Increase in 1880 over 1878.			933,966 55

The following tables show the percentage of gold and silver in the bullion during the past two years:

PERCENTAGE OF GOLD AND SILVER—1880.		
	Gold.	Silver.
Standard.	93	07
Noonday.	78 52	21 48
North Noonday.	40 53	59 41
Bodie Con.	50 50	49 50
Bulwer Con.	93	07
Belvidere.	37	63
Syndicate.	69	31
Dudley.	80	20
Scattering banks.	85	15

1879.		
	Gold.	Silver.
Standard Con.	92	08
Bodie Con.	55	45
Bulwer Con.	8	92
Noonday.	70	30
Sitting Bull.	90	10
Syndicate.	33	67

#### SUMMARY OF SHIPMENTS.

1877.	\$797,022 60
1878.	2,129,732 58
1879.	2,556,847 58
1880.	3,063,699 13

Total production to December 31, 1880. \$3,547,301 09

The above production was from the several mines, in the following proportion:

Standard.	\$5,117,516 08
Noonday.	2,236,121 72
Bodie.	2,436,259 60
Bulwer.	338,827 71
Bechtel.	71,690 58
Syndicate.	37,085 33
Belvidere.	25,901 25
Red Cloud.	10,927 50
Sitting Bull.	3,485 09
Mexican.	2,000 00
Dudley.	1,745 06
Kate Rogers (Summit).	338,827 71
Scattering.	132,445 26
Total.	\$3,547,301 09

Some of the large mines at Bodie will have to prove the existence of ore bodies at great depth before confidence will be fully restored, though mines are better at Bodie now than they were a short time since. One of the local papers, a short time since, had the following suggestions to make concerning a necessity of the camp: "To develop mining property requires capital. Having but a limited amount to invest in this class of securities, it is not the part of wisdom to consolidate that little, instead of each company struggling against hope and spending the little they have without being able to open up and develop their property. It is immaterial how favorable the prospects of our mines may be, we are now down to a point—the water level—requiring large expenditures to properly develop their hidden wealth. The financial condition of a single company will not permit of this expenditure, in view of which fact it appears to us that the proper and only remedy is a consolidation of adjoining properties. This will bridge the chasm and allow the work of development to proceed. Pool interests, joint forces, and a power is created that leads to immediate and successful results. Not consolidating the mines; sink combustion shafts at proper points along the line of the lead, each furnished with heavy pumping and hoisting machinery, and the companies interested in the combination each working their mine through the shaft. One of these two propositions must be adopted for the successful operation of a large number of mines in this district, and none will question it, in the interest of every stockholder that combination or consolidation should be general on the whole line of the lead."

The milling capacity of the district is 134 stamps. It is believed that this capacity will be doubled during the present year, and the bullion output largely increased. The business of the town of Bodie, which, during and subsequent to the excitement of a few years ago, was greatly overdone, is now assuming a more healthy tone, and those business houses which have survived the depression of the past year anticipate a prosperous season. The adjoining mining camp of Lundy or Mill Creek, situated 24 miles west, is attracting great attention, owing to the satisfactory results attained by the May Lundy mine in its milling operations. Aurora, 12 miles east, in Nevada, is also likely to enlist great interest during the year, as the Cook brothers are developing a rich mine in the properties recently purchased by them of ex-Governor Bladell. Tioga district, Mono county, is also regarded with much favor by mining men.

#### Hydraulic and Drift Mining.

The hydraulic and drift mines of California, which produce at least two-thirds of the bullion of the State, had a fairly prosperous year in 1880. Though late in getting to work, on account of the severity of the preceding winter, whereby the water was frozen up and the ditches filled with snow and ice, still the season proved, on the whole, an extremely favorable one, water being abundant and holding out until an unusually late period in the summer. Several of the larger companies might be said to have had water throughout the whole year, not having discontinued gravel washing entirely until the month of November. This only left them time enough to clean out their ditches and put their claims in good working shape before the advent of the recent winter rains, so short an interregnum of active operations having perhaps never occurred before in the history of hydraulic mining.

This branch of mining has, in fact, been improving somewhat for a number of years past, a result due to a variety of causes, such as greater experience gained by those engaged in it, to the employment of improved apparatus, increased water supply, better facilities for disposing of the tailings, etc.; no year having passed without bringing with it material gains in each of these respects. In nothing has this pursuit been so much advanced as through the constant enlarging of old and the building of new ditches, and the construction of reservoirs for storing and retaining for future use large quantities of water that before ran to waste. Through these additional aids the capabilities of this class of mines have, within the past few years, been increased fully 20%.

The principal localities where hydraulic mining is carried on is in Dutch Flat and Gold Run on the San Juan ridge, about Smartsville, at and near Cherokee, Butte county, and along in the districts adjacent to Slate creek. While the deposits on the Forest Hill divide, Placer county, are, in point of magnitude and richness, second to none elsewhere, the insufficient water supply restricts hydraulic mining in that locality to a comparatively narrow limit.

In Trinity, Siskiyou and Del Norte counties, occupying the northwesterly angle of the State, the business has been prosecuted over a large extent of territory and with a good measure of

(CONTINUED ON PAGE 76.)



## Tombstone District.

A correspondent of the *Citizen* writes as follows from Tombstone: The Mona mine, in the Turquoise camp, is showing up in excellent style. The new working double compartment shaft is now down 89 ft. and timbered from top to bottom in the best of style. They are down about the same distance on the discovery shaft, and when both shafts are down about 100 ft. they will run a drift to connect them. The ore is improving in richness, and the width of ledge is not known yet.

The Defense is not being worked at present, but a large force of men will commence work shortly.

The Contention (Turquoise camp) is down some 40 ft. and the bottom of the shaft is all in ore which will go well up into the hundreds. The Bradshaw is now down over 200 ft., and they are taking out \$1,000 rock.

The Tough Nut hoisting works are all completed with the exception of getting some of the machinery in place, which will be done in a day or two, when they will start up.

The Head Center and Tranquility Mining Co.'s are erecting hoisting works. The Head Center is now down about 420 ft.

It is the intention of the Contention and Grand Central Co.'s to run a railroad from Benson to Tombstone, if the Southern Pacific railroad does not commence shortly; so there is no doubt that we will have railroad connection soon.

The Vizina mine is shipping ore to the Boston mill daily, but the mill will not commence to run on the ore for some days yet.

Major Bayless has started work on the Anchor mine, and they are now down 25 ft., with a most satisfactory showing. It is his intention to open it up in earnest.

The mines along the Charleston road, in the southern part of the camp, are now attracting considerable notice.

The Oakland, owned by Messrs. Irwin and Poage, is down 25 ft., and showing up in excellent shape, and will continue to some depth further under the management of a San Francisco party, who is working it for an interest.

**MINING IN MAINE.**—Mining down in Maine is a funny business to lookers-on from the Pacific coast. The men running the mines appear to be old sailors and Nantucket whalers. They speak of the levels of a mine as "decks," and the force of men employed is the crew. The Superintendent is the skipper and the foremen are his mates. When the skipper passes through the main hatch and gets down to the bottom of a three-decker mine, he calls out along the main gangway toward where the "chase" (lode) was last seen, and asks his first mate: "How does she head?" "Sou-sou-west half west," says the mate. "Port your helm to the larboard and hold her a little more sou," says the skipper. "Aye, aye, sir," cries the skipper, "sou it is." Then, turning to his second mate, the skipper says: "Mr. Jones, are we making much water now?" "Just sounded the well, sir, and found out about four ft. I stopped the worst leak we had this morning at four bells." "Very well, sir; if she makes much water better man the pumps. Now, sir, if all is right below decks, suppose we go up to my cabin and splice the cable."—*Virginia Enterprise*.

ARIZONA expects to stand next to Colorado as a hullion-producing region this year.

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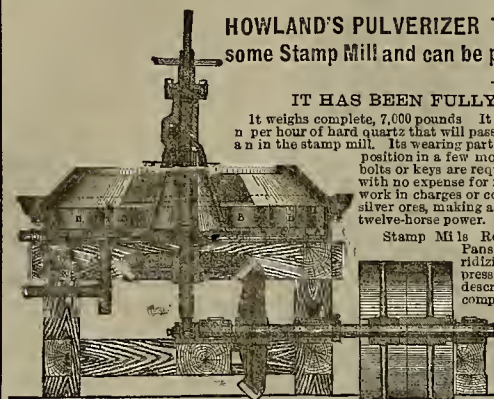
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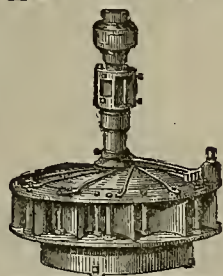
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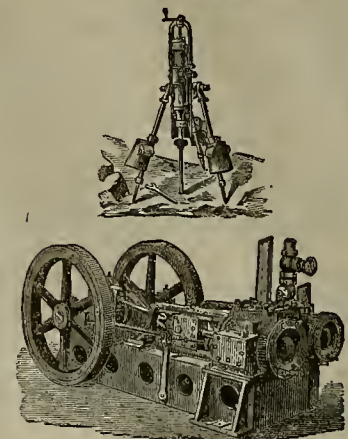
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the great lode in this city with a copy of the book for their  
inspection.



## Mines and Mining in 1880.

(CONTINUED FROM PAGE 73.)

success, many of the conditions there being extremely favorable.

In our drift mines great progress is being made. In many localities Eastern capital has been invested in this class of mines, and large areas of new ground are now being opened which will not be productive for some time to come. We have in very recent numbers of the PRESS had so much to say in general and in detail about this class that it is scarcely necessary for us to repeat it in this issue.

## Nevada.

The State of Nevada, so long this leader in the list of bullion producers, has dropped back to No. 3. This is due to several causes, the main one being the failure to find any new bonanzas on the Comstock, and this increased cost of mining at great depths. The Comstock is by no means played out, however, and any day a bonanza may be struck.

To even enumerate the various districts of Nevada with their prospects, would be more than our space will permit.

Eureka district has made itself famous by the enormous output of the Eureka Con. and Richmond Con. mines. Its great drawback is the expensive treatment of ore. Moreover, the district needs capitalists to take hold of some of its prospects and develop them systematically.

The formations underlying the comparatively shallow workings of the present day will have to be examined. Yet Eureka has many good mines, and has produced more than any camp in Nevada, with the exception of the Comstock. The district shows no abatement in vigor, but holds its own remarkably well.

On the Comstock, as we have stated, it has not been a prosperous year. This stock market affects that section of country more than any other, as that section of country affects the stock market. No bonanzas having been developed, no stock market boom was raised. Work continues, however, in the lower levels of the big mines, and some magnificent pumping machinery has recently been put up.

The two principal mines on the Comstock, the California and Con. Virginia, made this year what would elsewhere be considered heavy productions. The California produced \$890,575, and the Con. Virginia, \$1,756,536, an aggregate of \$2,647,151.

As we have taken the figures of expenses and production of a representative California mine, we will here take the figures of 1880 of a representative Nevada mine—the Con. Virginia:

This representative and noted bullion-producing mine, which has yielded a total of \$64,970,777 since it was opened, produced this year \$1,045,413.92 in gold and \$711,122.57 in silver, an aggregate of \$1,756,536.49. Average ore value per ton, \$31.76. Ounces fine silver for 1880, 54,977,650; average value per ounce, \$2.86. Weight of bullion produced during the year, 21 tons and 102 lbs. Ounces fine silver produced to date, 2,763,356,030; total weight, 1,159 tons 732 lbs. Total number of bars, 17,860. Ore on hand December 31, 1879, 135 tons; ore extracted during 1880, 55,562; total, 55,697 tons; ore reduced, 55,315 tons and 400 lbs.; on hand January 1, 1881, 381 tons and 1,600 lbs.; total cost per ton for extraction and reduction, \$17.04. They have now on hand at the mills and in the ore-houses, 381 tons and 1,600 lbs., valued by assay at \$12,125.96. In addition to the ore extracted there have been raised from the mine during the past year 14,325 tons of waste rock.

To show the great cost of mining such an extensive mine, we append the financial statement which gives the items:

RECEIPTS FOR THE YEAR 1880.	
Cash on hand January 1, 1880.....	\$ 5,794 74
Samples.....	274 77
Rebate.....	168 80
Assaying.....	13,764 41
Supplies.....	13,694 44
B. & B. joint department.....	12,381 95
Drafts on Secretary.....	1,073,682 33
Samples produced.....	933 02
<b>Total.....</b>	<b>\$1,125,644 46</b>
DISBURSEMENTS FOR THE YEAR 1880.	
Salaries.....	\$ 6,100 00
Wages.....	214,132 25
Wood.....	4,767 50
Timber.....	35,843 26
Water and ice.....	10,776 80
Candles.....	5,632 00
Powder, fuse and caps.....	8,214 62
Miscellaneous supplies.....	13,849 53
Office expense.....	847 20
Assay office wages.....	10,601 50
Assay office supplies.....	7,268 01
Team expense.....	410 70
Legal expense.....	15,485 16
Taxes on real estate.....	2,389 12
Taxes on proceeds.....	35,507 88
Holding.....	61,644 00
Reduction.....	497,836 80
Construction—half expense of C. & C. shaft.....	93,500 00
Sutro tunnel, half royalty.....	33,977 50
Sutro tunnel, account of lateral drift.....	49,980 00
Hospital and contribution.....	40 00
Interest and exchange.....	3,115 93
Transportation and hauling.....	1,419 69
B. & B. joint mine.....	4,967 12
Samples shipped.....	1,053 39
Samples on hand.....	154 40
Cash on hand.....	1,659 50
<b>Total.....</b>	<b>\$1,125,644 46</b>
ACTUAL COST OF MINE.	
Supplies on hand January 1, 1880.....	\$ 5,000 00
Salaries and wages.....	220,222 25
Water and ice.....	10,776 80
Miscellaneous supplies.....	67,806 91
Office expense.....	847 20
Assay expense.....	17,750 11
Team expense.....	410 70
Legal expense.....	15,485 00
Taxes.....	37,897 00
Holding.....	61,644 00

Reduction.....	497,836 80
Sutro tunnel, ore royalty.....	33,977 50
Contribution.....	40 00
Interest and exchange.....	3,115 93
Transportation.....	1,419 69
Best & Belcher joint mine.....	4,967 12
<b>Total.....</b>	<b>\$ 979,387 17</b>
Sale of supplies.....	\$ 13,694 44
Rebate.....	168 80
Assaying.....	13,764 41
Balance—being actual cost of mine.....	140,750 52
<b>Total.....</b>	<b>\$ 979,387 17</b>

Average cost per ton.....	\$ 17 04
Half expenses C. & C. joint shaft.....	93,500 00
Entire cost joint shaft to date.....	1,553,462 80
Sutro tunnel lateral drift.....	49,980 00
Average daily wages.....	4 05

INVENTORY OF PROPERTY.	
Real estate.....	\$12,500
Hoisting works.....	10,000
Machinery.....	50,000
Superintendent's and assay office.....	50,000
<b>Total.....</b>	<b>\$122,500</b>
Depreciation in value the past year.....	70,500
Valuation at last report.....	193,000

INVENTORY OF C AND C SHAFT.	
Real estate.....	\$ 15,000 00
Hoisting works and all machinery.....	350,000 00
375 cords wood.....	3,375 00
250,000 feet timber.....	4,500 00
Stone coal.....	320 00
5 tons steel.....	1,600 00
4,876 pounds plate iron.....	326 30
30 tons iron.....	300 00
202 boxes candles.....	1,212 00
595 gallons oil.....	505 00
1,200 bushels charcoal.....	348 00
Gas pipe.....	144 00
Miscellaneous supplies.....	7,500 00
<b>Total.....</b>	<b>\$385,280 00</b>

BULLION YIELD FOR THE YEAR.	
Gold.....	\$1,045,413 92
Silver.....	711,122 57
<b>Total.....</b>	<b>\$1,756,536 49</b>
TOTAL PRODUCTION TO DATE.	
Gold.....	\$29,075,338 89
Silver.....	35,895,430 06
<b>Total.....</b>	<b>\$64,970,777 95</b>

In addition to the above, the matter of the C. & C. shaft is to be considered. They received from various sources toward work on the shaft \$442,359 33, and a like amount was expended. In these expenditures the following items are the heaviest: Wages, \$140,362; candles, \$140 93; powder, caps and fuse, \$19,970; timber, \$64,233; wood, \$108,615; ice, \$16,975; wire cables, \$3,412.

We can give briefly, also, the figures which show the year's work of the California mine: During the past year ending December 31, 1880, there were extracted from the mine 37,454 tons of ore. There were remaining in the ore-houses and at the mills at the end of the year 905½ tons of ore. There have been reduced 33,395 tons, yielding bullion to the value of \$890,515 33, or \$23 21 per ton; this yield being over 75% of the assay value of the ore, no allowance being made for moisture.

The value of the gold contained in the bullion was \$247,728 89, and of the silver \$342,786 44.

In addition to the ore extracted, there have been raised from the mine 10,363 tons of waste rock.

Space will not admit of the publication in full of the financial statements accompanying the report of this company. Expenditures amount to \$817,188 48, and following are some of the principal items: Salaries and wages, \$149,683 50; Ophir, etc., for labor, \$26,494 87; timber, wood, ice, etc., \$56,014 60; total taxes, \$12,879 70; reduction, \$345,238 20; half expenses C. & C. shaft, \$98,500; Sutro tunnel royalty, etc., \$63,932 30. The actual cost of the mine was \$675,144 29; cost per ton, \$17 60; average daily wages, \$4 03. Ounces of fine silver in the year's output, 26,475 790; value per oz., \$29 7½; weight of bullion, 10 tons, 479 lbs.; number of bars, 164. Total production to date:

Gold.....	\$23,810 331 93
Silver.....	33,432 490 12
<b>Total.....</b>	<b>\$46,742 781 17</b>
Ounces fine silver to date, 1,312,237,340; weight, 664 tons, 450 lbs.; number of bars, 11,020.	

These two great mines have produced together \$129,720,559 05, a sum of money difficult to imagine even, as coming out of a couple of holes in the ground. Some newer sections of country, about which a great deal of stir is being made, and which have produced a few millions, have made more fuss about them than has been made about the two mines mentioned. It must be remembered that two mines, only, produced this immense sum, and are still producing between them, two and a half millions of dollars a year.

## Arizona.

Arizona is just now attracting a great deal of attention, and numbers of miners are flocking in that direction. The completion of the Southern Pacific railroad through the Territory has opened up new avenues of trade, and inspired life and activity in all branches of business. It is now possible for mining men to open up and develop mining property which, hitherto, it has been almost impossible to undertake with any reasonable chances of success. New mining camps have been organized, and old ones have been developed; mills and smelters have been brought in for the reduction of ores; towns have sprung up along the line of the railroad, and the population of mining camps has in many instances more than doubled during the past year.

There are numbers of small veins containing high grade ore, which will support a large pop-

ulation. There have been a great number of new districts opened within this past two years, and many valuable mines have been found. The principal difficulty there now, is the great number of men who want to sell their claims, compared with the number who want to work them. This evil will remedy itself, however, since the miners must eventually go to work on their own claims, and prove them up.

We have during the past year given a great deal of space to an enumeration of the resources of Arizona, so it would be superfluous for us to go over the ground again. The number of districts and vast extent of mining territory precludes the possibility of any extended review. The Tucson *Star* on the 1st inst. published an exhibit of the growth of Pima county for the year, which may be taken as a gauge.

The population has more than doubled; freight receipts were five times greater than the previous year; 5,485 mining locations were recorded, and 1,606 sales of mining property effected. The city of Tucson has increased its population one-third. The amount of freight delivered in Tucson during 1879 was 12,000,000 lbs., and during 1880 over 70,000,000 lbs. Property has appreciated in value 60%; the amount expended in building and improvement was over \$400,000, of which \$50,000 was for railroad building. The Southern Pacific Railroad Co. has laid 325 miles of track since February 1st. The entire span of track across Arizona from Yuma to New Mexico is 339 miles. All kinds of business throughout the Territory has increased in an astonishing ratio during the year.

Tombstone is the big district of the Territory. The *Citizen* gives the bullion yield of the Tombstone mines for the year 1880 at \$3,012,223, as follows:

Tombstone Company's mills.....	\$ 913,443
Corbin mill.....	36,000
Contention mill (nine months).....	1,200,000
Harshaw mill (four months).....	35,655
Opper Queen (four months).....	300,000
Boston and Arizona Reduction works.....	36,625
Sunset mill (short run).....	22,500
Holland (trial run).....	20,000
Placer gold, Pinal county.....	18,000
Other mills and arrastras.....	100,000
<b>Total.....</b>	<b>\$3,012,223</b>

The actual yield of the Contention (now known as the Western) mine, as officially reported by the Secretary, D. C. Bates, is \$1,214,055, that being the face value of the bars as shipped. The proportions of gold and silver are as follows:

Gold.....	\$ 224,443
Silver.....	989,607
<b>Total.....</b>	<b>\$1,214,055</b>

It is expected that six other mines in Pima county will contribute to the bullion supply for the current year.

The *Citizen* says of the copper ore developments in Arizona that the coming year will witness a growth of copper production that will rival the famous Lake Superior region, while in the future, as new discoveries are made, and new companies commence work, the industry will form no inconsiderable portion of Arizona's greatness.

## Utah.

Utah is doing excellently well, and while there is not now so much excitement about her mines as there was a few years ago, a more healthy tone is manifest. Her principal city is now deriving great benefits from the mines, to the northward as well as her own mines. Those who desire to go deeply into the history and statistics of the different districts of Utah, had better get one of the immense twelve page numbers of the Salt Lake *Tribune*, issued on the 1st inst. This paper gave an excellent review of the year in Utah, and gave a complete record of each district.

A perusal of the review of each mining district will show to the reader two prominent facts. The first is that among mining countries Utah is entitled to first rank; and second, only preliminary work has been, as yet, performed. There is not as yet a real deep shaft in the Territory, there are but four or five which are entitled to be considered as anything but prospecting holes. The minerals range through every variety. There are silver, gold, lead and copper, with all the metals which in any country are found in conjunction with those metals, while the iron deposits of the State are measured by mountains and the coal measures by counties. Of the latter two the supplies are inexhaustible and embrace all varieties. Of the gold, silver, lead and copper producing districts, many are making revelations which must soon draw a boom. Without slighting the others, Parley's Park, Stockton, Bingham, Tintic, Marysvale and Frisco deserve particular mention, because in these districts the most vigorous work is being performed. Still, there are men who claim that Star district is yet to be the coming camp, and one mine—the Silver Belle—in American Fork, begins to threaten to be the highest little mine, and not very little either, in the world. The Ontario at Parley's Park, is one of the wonders of Utah. Some shrewd men purchased it years ago at a low figure. Since then it has dishured in dividends \$3,150,000, and now in its lowest workings it is richer than it has been anywhere higher up. General Conner commenced at Stockton upon a little fissure a couple of feet wide, now at a depth of 300 feet, he has twenty-four ft. of ore. The last year's work in two or three important mines in Bingham has uncovered ore at a depth which the timid ones were afraid to explore. Enough has been done to show that the annual shipment of bullion from Utah is to increase every year for a generation, if not for generations to come. This peculiar silver

sandstone district of Silver Reef, Utah, produces over \$1,100,000 in bullion in 1880.

## Colorado.

The State of Colorado takes the first place in the rank of bullion producers this year, as our tables of bullion production show. A large amount of capital from the East has been brought into Colorado within this past two or three years, and the miners have been thus assisted in developing their properties, so that rapid progress has been made. Although there are a large number of camps in the State, Leadville overreaches them all. The *Leadville Herald* gives the following figures for the production of the camp:

From January 1, 1879, to July 1, 1879.....	\$ 7,813,866
For the month of July.....	1,054,439
For the month of August.....	1,296,352
For the month of September.....	1,505,085
For the month of October.....	1,339,168
For the month of November.....	1,032,026
For the month of December.....	1,002,779

**Total.....\$15,040,715**

## PRODUCTION AT EACH SMELTER.

Proving the total from the several smelters, the result is as follows:

Grant Smelting Co.....	\$ 4,018,290
Eddy, James & Co.....	1,363,334
La Plata.....	2,316,310
Leadville.....	14,218
American.....	1,230,126
Billings & Eilers.....	700,701
California.....	702,826
Dickson & Co.....	63,061
Little Chief.....	109,072
Chloride, Barton Mill.....	150,200
Ohio & Missouri.....	822,656
Cummings & Finn.....	1,234,213
Gage, Hagaman & Co.....	213,697
Oro Stamp Mill.....	3,438
Orla Chief.....	18,400
Tahor Mill.....	11,250
Elgin.....	462,439
Harrison.....	917,304
Robert E. Lee Mine shipped.....	114,318
Colorado Prince Mill.....	22,000
Gulch Mines.....	70,000

**Total.....\$15,040,715**

In addition there are 23,250 tons of ore on hand at the smelters, which is an increase of 15,000 tons over the amount of last year. This will make an increase of about \$1,000,000, which brings the approximation of the entire production to \$16,000,000.

The product of 1879 was \$10,189,521, which, compared with that of 1880, shows an increase for this year past of over 50% in the export.

The *Leadville Democrat* gives a list of the Leadville mines, showing the capital, par value of shares, and dividends paid up to January, 1881. This list comprises 42 mines, of which 16 have paid dividends, as follows:

Amie.....	\$ 305,000
American Consolidated.....	90,000
Breece Iron.....	20,000
Chrysalide.....	1,100,000
Chloride.....	150,000
Catalpa.....	60,000
Dunkin.....	105,200
Hibernia.....	100,000
Evening Star.....	125,000
Little Chief.....	700,000
La Plata.....	250,000
Leadville.....	150,000
Little Pittsburg.....	1,350,000
Evening Star.....	240,000
Robinson Consolidated.....	250,000
Robert E. Lee.....	1,200,000

**Total.....\$6,225,200**

It is said that these and other Leadville mines had previously divided among their owners \$5,697,300 in profits. For the limited time this camp has been prominently before the public it has done remarkably well.

## New Mexico.

New Mexico is now sharing with Arizona an influx of population and a rapid increase in prosperity. The summer climate of the northern part of the Territory is delightful. At Santa Fe, which has an altitude of about 7,000 ft., the nights are always so cold that heavy blankets upon the beds are comfortable, and the heat at midday, although sometimes great, is never oppressive. The winters are mild and sunny, with comparatively little snow. The low altitudes in the central and southern portions of the Territory are very hot and dry, but on account of the absence of moisture in the atmosphere and the exceedingly rapid evaporation, the apparent intensity of the heat is much reduced. The temperature of the mountains is always and everywhere delightful. The country has not yet been prospected to any extent. It lacks facilities for reduction of ores and means of transportation. But all this will be remedied before long. The mining outlook in the Territory is at the present time very encouraging. In the northern counties new mills are being erected, and machinery put in with activity. In the middle counties smelters are being erected, new discoveries are being made and parties of men are fitting out at every station for a few weeks' trip into the mountains. Gold, silver, copper, carbonates of lead and galena are found at almost every turn. The Black Range, Mogollons and Magdalena are showing prospects that to say the least are encouraging considering the amount of development. The *Herald and Southwest* say that in the southern section new locations are reported every day, and assays made which warrant the expenditure of considerable money in going deeper and drifting.

The country is badly in need of capital to develop some of the mines already found, but this will come before long. The railroad will bring the capitalists and the capital.

## Idaho and Montana.

Both Idaho and Montana are coming forward in bullion production again, though both have been languishing somewhat. Now, however, the mining excitement has brought to them an increased population, and new camps have sprung up, new mines been opened, and an era of prosperity set in. In Idaho the Wood River, Saw-



tooth and Yankee Fork mines are doing very well indeed. Wood River ores are shipped to Salt Lake at an expense of about \$60 per ton. In fact, the principal mines are owned by Salt Lake capitalists. Nineteen different mines sent in lots which aggregated 358 tons and 1,291 lbs. for which the owners received \$59,879.41, which is equal to an average of over \$168 per ton. All these shipments came from mines which were unknown eight months ago. By next spring, there will be a rush to the Wood River country. Montana is entering upon an era of renewed prosperity. The mines about Butte and Helena are the more prominent. Within a radius of 25 miles of Helena there are 133 stamps in operation, and 205 more will be added by spring. At Butte reduction works have been added of late, until now its camp is one of great importance. Montana was formerly a very large bullion producer, when her gold placers were in their prime, but now her quartz mines will do much to build up for her a permanent population. The Butte *Miner* gives the bullion shipments from Butte, Montana, for the year 1880 at \$1,428,088.

Oregon, Washington and Dakota. Oregon mining interests, when compared with those of the other States and Territories of the Pacific coast, are comparatively small. She has a number of good mines, however, and during the year a number of new ones were opened. The *Oregonian* claims that it is now known beyond a peradventure that large bodies of silver-bearing ore exist in the vicinity of Granite and Olive creeks in the counties of Grant and Baker, Oregon, wholly dissimilar in character, but equally profitable to the State when practically worked.

Washington Territory can afford to be without any gold mines while she has so many coal mines within her borders. Her coal interests are very extensive, and are being now fully developed.

Dakota keeps its position as a bullion-producer. The Black Hills mines, which created so great an excitement a few years ago, are being worked profitably, and several of the more prominent ones are paying regular dividends.

This review has already exceeded the limits originally set for it and we are compelled to omit mention of many things we had intended to refer to.

**HAGGIN & TEVIS.**—The well-known business firm of Haggin & Tevis, which has for so long a period been allied with leading business enterprises of the coast, is to be dissolved. The members of this firm are owners and managers of a great deal of mining property on this coast, and have for a long time identified themselves with the mining interests. As to the cause of the dissolution of co-partnership, Mr. Haggin says that for years the business of the firm had been assuming gigantic proportions; so much so, that, in fact, it had of late been impossible for either Mr. Tevis or himself to act jointly upon any matter; but that each had been driven, under pressure of business, to devote himself exclusively to his particular branch of the firm's affairs. It had, therefore, been considered by the partners expedient to dissolve business relations and wind up their affairs. The change did not involve any material modification of their former business pursuits, each being prepared to prosecute those matters most congenial to his tastes. While it was a matter purely of a private nature, the public were welcome to know, should it be of any interest, that individually, the late partners had no differences, and yet sustained the most friendly relations the one toward the other.

#### News in Brief.

THE health of Virginia City is now excellent.

SEVENTY patents were issued to women in 1880.

DIPHTHERIA is causing many deaths in New Brunswick.

THE Chileans numbered 40,000 at the surrender of Lima.

SITTING BULL has again retreated across the Canadian line.

A MOVEMENT is organizing in England against coercion in Ireland.

THE widow of the late Gen. Sutter died at Lititz, Pa., recently.

IT is said that Southern Wyoming wants to be annexed to Colorado.

CALLAO, as well as Lima, has been surrendered by the Peruvians.

THREE earthquake shocks were felt in the city and Oakland on Monday night.

A SHOCK of earthquake was felt at Bath, Maine, on the night of the 20th.

THERE are three inches of snow in New Orleans—the heaviest fall since 1852.

PARADISE VALLEY, Nev., raises 15,000 acres of wheat yearly, and has no flour-mill.

TRACK-LAYING on the Carson and Colorado railroad is still making rapid progress.

FLOODS have recently caused considerable damage in upper Washington Territory.

A COMPANY of Ohio capitalists is about to organize to lease the Cincinnati Southern railroad.

AN oyster war is in progress on the Rappahannock between the Marylanders and the Virginians.

THE Baldwin Locomotive works are building 144 locomotives for the Denver & Rio Grande R. R. Co.

#### Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORNE—San Francisco.  
A. C. KNOX—Pacific Coast.  
G. W. MCGRAW—Santa Clara county.  
M. P. OWEN—Santa Cruz County.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
N. E. BOYD—San Bernardino Co.  
JAMES C. HOAG—California.  
E. W. CROWELL—Colusa and Yolo counties.  
D. W. KELKHAUSE—Fresno, San Benito, Monterey and San Luis Obispo counties.

#### Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St., S. F.

#### The Californian.

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FOR SALE BY ALL DEALERS.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquariae is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

THE MINING AND SCIENTIFIC PRESS finished its 41st volume with its last publication. We do not know the circulation of the paper in this community, but we do know that every mechanic and miner ought to take it, for by so doing they would benefit themselves far more financially than they are aware of.—*Shasta Courier*.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

#### Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

#### DIVIDEND NOTICE.

OFFICE OF THE  
Eureka Consolidated Mining Company.

Nevada Block, Room 37, San Francisco, January 15, 1881. At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 63), of Fifty (50) Cents per share was declared, payable on Thursday, January 25, 1881. Transfer books closed until the Twenty-first (21) instant.

P. JACOBUS, Sec'y pro tem.

#### ANNUAL MEETING.

The Annual Meeting of the Stockholders of the REAL ESTATE AND BUILDING ASSOCIATES will be held at the office of the Company, No. 230 Montgomery Street, on Monday, the seventh (7) day of February, 1881, at twelve o'clock noon of said day.

LUIS F. EMILIO, Sec'y.

**Blue Bird Mill and Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Globe District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Eighth (8) day of January, 1881, an assessment, No. one (1), of Five (5) Cents per share was levied upon the capital stock of the corporation, payable immediately, in U. S. gold coin, to the Secretary, at the office of the Company, No. 10 Market Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Fourteenth (14) day of February, 1881, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Fourteenth (14) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

W. H. KNIGHT, Sec'y.

Office No. 10 Market Street, San Francisco, Cal.

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CHAS. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer.

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CHAS. E. LOCKE.....Lessee and Manager.

##### THE BELLS OF CORNEVILLE.

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##### THE TIVOLI GARDENS.

KRELLING BROS.....Managers

##### CINDERELLA.

Eddy Street, between Market and Mason. Open every evening.

#### Metals.

[WHOLESALE.]  
WEDNESDAY M. Jan. 26, 1881.

IRON.—  
American Pig, soft, ton.....30 00 @33 00  
Scottish Pig, ton.....25 00 @26 00  
American White Pig, ton.....27 00 @—  
Oregon Pig, ton.....— @—  
Refined Bar.....4 1/2 @ 8  
Horse shoes, keg.....7 00 @ 8 00  
Nail Rod.....— @ 9 1/2  
Norway, according to thickness.....8 1/2 @ 9 1/2

STEEL.—  
English Cast, lb.....16 @ 18  
Black Diamond, ordinary sizes.....13 @ 15  
Drill.....3 @ 10  
Flat Bar.....— @ 16  
Plow Steel.....9 @ 10

COPPER.—  
Ingot.....— @ 52  
Sheet.....— @ 20  
Sheathing, Tinned 14x18.....— @ 42  
Nails.....— @—  
Bolts.....38 @ 42  
Old.....— @ 18  
Bar.....— @ 22  
Precipitate, 100 fine.....18 @ 19

LEAD.—  
Pig.....4 1/2 @ 5  
Bar.....— @ 6  
Pipe.....— @ 8  
Pipe, Sheet.....— @ 9  
Shot, Discount 10% on 500 Bags.....— @ 2 10  
Drop, per bag.....— @ 2 30  
Buck.....— @ 2 50  
Chilled ".....— @ 2 50

TIN PLATE.—  
10x14 1/2 C Charcoal.....— @10 50  
10x14 1/2 C Oak.....10 00 @10 00  
Banco Tin.....— @25 00  
Australian.....— @20 00  
I. C. Charcoal, Roofing 14x20.....— @10 00  
20x28.....20 00 @21 00

ZINC.—  
By the Cask.....— @ 10  
Zinc, Sheet 7x3 ft. 7 to 10, lb, less than cask.. 10 1/2 @ 11  
NAILS.—  
Assorted sizes.....4 00 @475



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For Consumption, Asthma, Bronchitis, Dyspepsia, Catarrh, Headache, Debility, Rheumatism, Neuralgia and all Chronic and Nervous Disorders. It is taken

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R. HUGHES, Proprietor.

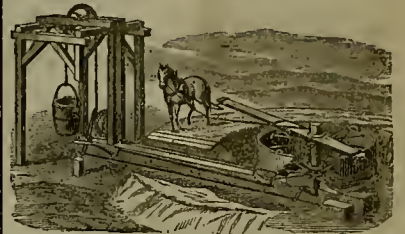
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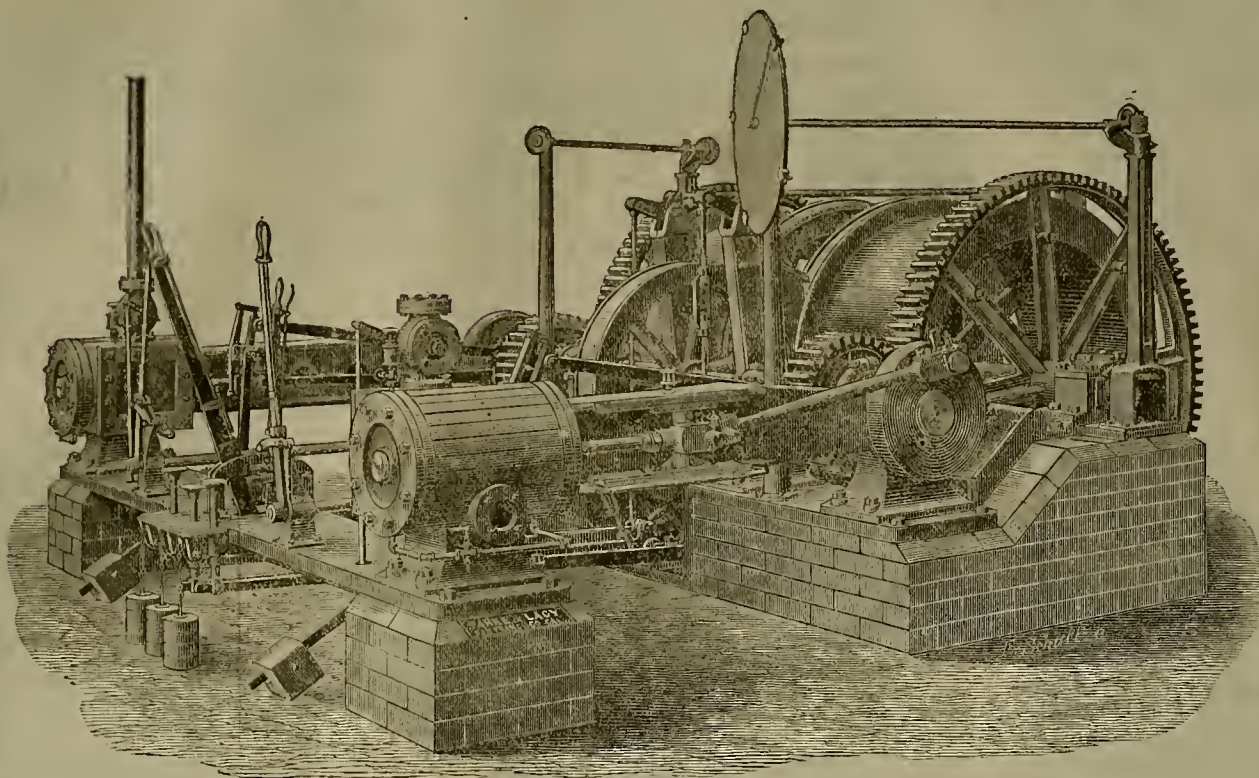


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### California Inventors

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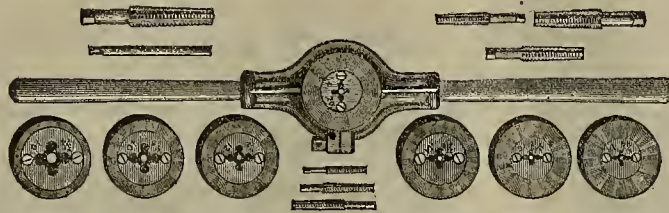
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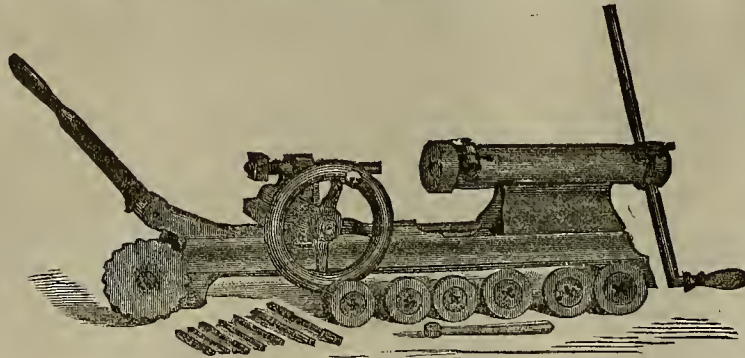
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**'49 AND '50.**

MR. JOHN VANCE CHENEY'S new historical story of early days upon this Coast will be commenced in the next number of "The Californian."

A NEW SERIAL STORY will be commenced in the next number of THE CALIFORNIAN which will run during the remainder of the year. It is entitled "'49 and '50," and is a story of early days upon this coast. The author is Mr. John Vance Cheney, whose articles in the leading Eastern magazines and in THE CALIFORNIAN have received such wide and merited recognition. Mr. Cheney has had this story in preparation for THE CALIFORNIAN for some time. Competent critics, to whom it has been submitted, pronounce it at once realistic and fascinating. The stirring events of 1849 and the succeeding year are vividly pictured. Absolute truthfulness of impression is sought rather than idealization. A thread of romance runs through the work, and the interest is sustained to the end.—(Note Book).

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**'49 AND '50.**



# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, FEBRUARY 5, 1881.

VOLUME XLII  
Number 6.

## The Richmann Belt Air Compressor.

In the PRESS of Dec. 4th last, we described in detail a newly-invented piece of California mining machinery, which was patented through the MINING AND SCIENTIFIC PRESS, Patent Agency by Henry Richmann. We refer to the Richmann steam power double-acting air compressor. On this page we illustrate another form of this improved apparatus, this one being intended to be driven by gear in belt form, or independent engine or water power. The Richmann belt air compressor is constructed on the same principle as the steam power compressor, excepting that it is driven by a belt connected with a pulley attached to the crank shaft, which is made long enough to allow an additional loose pulley if required. It occupies no more space than the steam power compressor, and from its lightness is easily transported. No air receiver is required to these compressors. They are simple in construction, compact, and the various parts so nicely balanced that there is no undue strain upon any one part.

In case water power can be had for driving compressors great economy is assured, as by an attachment to a water wheel the compressor can be run without the expense of fuel. These machines are made from 6x13 ft., compressing 75 cubic ft. of free air per minute, to run two 2½ inch or one 3-inch drill, up to 14x14 adapted to compress 349 cubic ft. of free air per minute and to run five 3-inch drills.

The water jacket around the air cylinder is arranged to keep a constant circulation of cold water, maintaining a uniform degree of temperature around the valves and the entire length of the cylinder. The air is thus forced into the supporting columns, (i. e. the receiver), in a perfectly cool state; and, as no water enters the cylinder, the air is delivered into the receiver free from moisture.

The valves open with the least pressure of the atmosphere, allowing the cylinder to fill up to its full capacity, and instantly close on the return of the piston.

This machine is very light and portable. It is unnecessary for us to go into details of construction and operation of the compressor, as we described its points in speaking of the other style in the article above referred to. These machines are made by the Richmann Drill Air Compressor Co., Nos. 25 and 27 Stevenson St., in this city.

**WHITE PINE REDIVIVUS.**—The Eberhardt & Aurora Co., of White Pine, has been re-incorporated and reorganized, with a capital of \$1,050,000, with which to prospect and work the company's property. The new company is called the Eberhardt Co. Limited. There was perfect harmony among the stockholders in adopting the new scheme, and a firm faith seemed to have animated them that old Treasure hill will yet show up a bonanza that will repay for all their long waiting and outlay. This news has instilled new hope among the people of Hamilton, and once more they look on the bright side of what a few weeks ago seemed utter darkness. The chairman in closing the meeting said: We have just sent a little more money to Captain Drake to drive along, because he was prepared to shut down, rather than incur any debt, and telegraph over here. We telegraphed to him at once that the meeting had passed the resolutions, and that we were just going to send him out money to explore, and I hope we shall get good results.

**THE** hullion shipments from neighboring mines through Wells, Fargo & Co's. office at Nevada City, for the month of January amounted to \$97,000. The Transcript says this is a light month's product, owing to the stormy weather that has recently interfered greatly with mining operations of all kinds.

**SAN BERNARDINO** is at present one of the most substantially prosperous towns in the State. Considerable building is going on, and the business men of the town and surrounding farmers are encouraged with the outlook for the season.

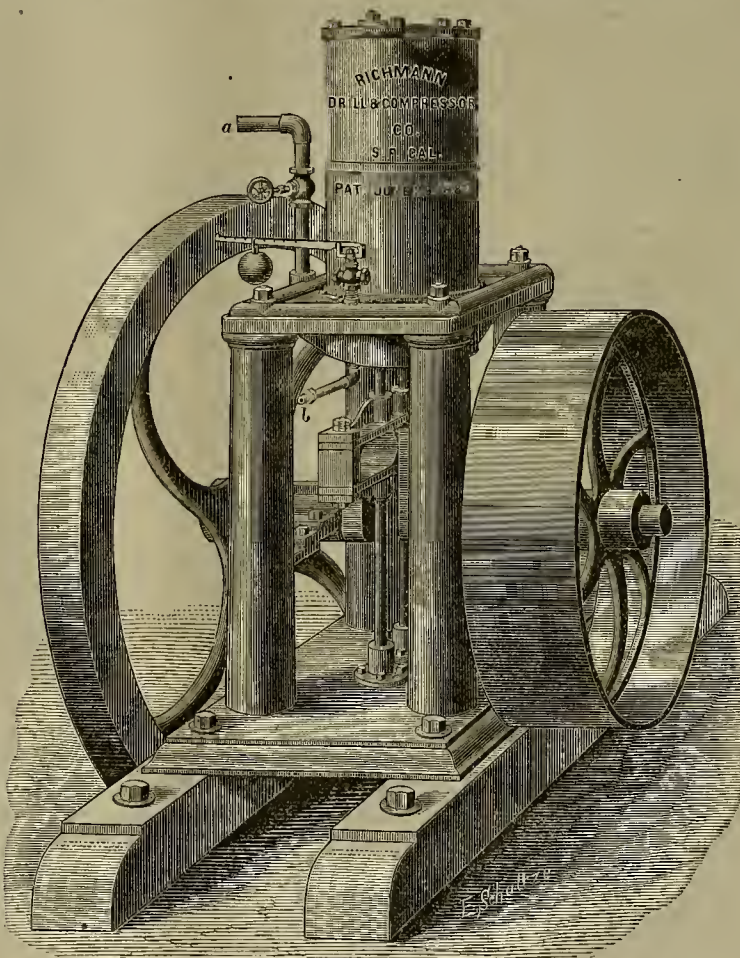
**THE Eureka Con. Mining Co.**, has declared the usual monthly dividend of 50 cents per share payable on the 20th.

## Nevada and Colorado.

The Con. Virginia mine, on the Comstock, has produced up to Dec. 31, 1880, the sum of \$64,970,777.95. Of this \$29,075,338.89 was gold and \$35,895,439.06 was silver, so it is not all silver by any means that comes from the Comstock, as many persons believe. The California mine also yielded last year \$890,515, of which \$247,728 was gold. This mine has also produced immensely, its total production has mounted up to \$46,742,718.17, of which \$23,310,281.98 was gold.

These two great mines have therefore pro-

duced 000; of the San Juan region, with \$500,000, and of Summit county with \$250,000 production. It may be as well for these same Colorado gentlemen to notice that the Comstock is by no means played out when any one mine can do as much as this in a year. It is only one of many too, but is the largest producer. If this mine was in Colorado, where Eastern capitalists would be apt to see it, no doubt it would be the most wonderful in the world. But as it is out here in the mountains of Nevada it is of small consequence. There has been more talk and more hundreds of columns of printed matter about the camps in Colorado previously mentioned as producing less than this one mine, than about the whole Comstock the past year. There are two or three newspapers in each camp, and to



THE RICHMANN DOUBLE ACTING BELT AIR COMPRESSOR.

duced \$129,720,559.05, a pretty round sum when carefully considered, and an amount it will take some extensively advertised camps a good many years to over-shadow. We speak of only two mines on the Comstock although there are many others which have produced many millions.

We hope some of the Colorado men, particularly, will take note of these figures, since they imagine that Leadville has already produced more than the Comstock. Leadville claims to have produced this year \$15,095,133; in 1879 it produced \$10,189,521; in 1878, \$3,152,925, and in 1877, \$555,330. From 1860 to 1880, both years inclusive, Leadville produced a little over \$35,000,000, a little more than half, in its whole existence, more than one mine alone on the Comstock produced. Consolidated Virginia only produced last year \$1,756,536.49, which amount is greater than that produced by any whole district in Colorado except Leadville, Gilpin county and Clear Creek. It is ahead of Boulder, which produced only \$1,000,000, or Rosita and Silver Creek, which produced \$1,000,000; of the Park county, with \$500,

read them one would imagine the mines were each producing millions. Colorado with its big Leadville mines ranks first this year in hullion production. California comes next and shows an increase, and will show a greater increase this year. With Colorado this is doubtful, however, as her Leadville mines will not do so well. Both California and Nevada may be kept in the memory of the Eastern mine investors therefore, as they have not gone clear out of sight by any means.

**PROF. THOMAS PRICE** says southwestern Nevada, and more particularly Lida valley and Gold Mountain districts contain some of the best mines in the State. The only drawback to their development is their inaccessibility, but that will be removed when the railroad south from Austin and the Carson & Colorado railway reach that vicinity. The State Lines series of mines, in Gold Mountain district, are very valuable properties.

A MINING expedition, composed mostly of young men, left Newport, R. I., the other day, for Atrato river, Panama.

## Foundry Notes.

The Fulton Iron Works has just finished a hoisting engine for the Tomhstone mine, Arizona. It is a horizontal, 35-horse power engine, supplied with two reels for hoisting, and capable of hoisting from a depth of 1,000 ft. with a steel wire cable. The cylinders are 9 by 16. The reels are five ft. in diameter, and have 24 inches space for the cable to wind on. The engine is supplied with all modern improvements in its class of machinery. Each of the reels has attached to it a dial, on which the progress of the cage up or down is recorded. Running at an average speed it will raise or lower the cage 1,000 ft. in two minutes. The mine is at present about 300 ft. deep. The entire structure, with bed-plates and other appurtenances, weighs, in round numbers, 30,000 lbs., and cost at the shop about \$7,500. Delivered at the mine it will have cost \$10,000, and possibly more. The boilers for supplying the engine with steam are already at the mine.

The demand for machinery from the Tomhstone district has not been confined to hoisting works. The Fulton Iron Works has already sent four mills for crushing ore to the district, and is just finishing a fifth. These mills are the Tomhstone, 10 stamps; the Corbin (belonging to the same company), 20 stamps; the Contentment, 25 stamps; and the Sunset, 15 stamps. The Grand Central mill, which is just being finished, has 30 stamps. An addition of five stamps is also being prepared for the Tomhstone mill.

The trial trip of the steamer *Estada de Sonora*, for the Mexican trade, was made the other day, for which vessel the Fulton Iron Works built boilers and engines. She was built in one of the northern coast shipyards and brought to this port under sail. She has a steam windlass and a steam engine for handling cargo, and they work to perfection. She is 167 ft. long, 28 ft. beam and 14 ft. depth of hold, and has accommodations for 45 cabin and 100 steerage passengers. She has compound engines; her high pressure cylinder is 20 inches in diameter, 30-inch stroke, and her low pressure 38 inches in diameter, 30-inch stroke, and a composition propeller 10 ft. in diameter.

In the case of John Lawson, agricultural claimant, versus Warren Hinsey et als., mineral claimants, C. L. Street, attorney for Lawson, has received the decision of the Commissioners of the General Land Office in favor of Lawson, deciding the land to be agricultural. The land embraced in the decision is near Reynold's ferry, Tuolumne Co., through which the mineral claimants have commenced running a tunnel for the purpose of turning the Stanislaus river, and thereby enable the working of about two miles of the bed of the river.

**THE** Clarence King party of geologists, statisticians, mineralogists and other scientists now at work on the Comstock expect to complete their labors in about two months more. They have made quite a long stay with us; some of the party have been here so long that we are beginning to look upon them as citizens of our town. We could not have a better class of men for citizens, and are ready to adopt them whenever they shall say the word.

**THE** Ontario, one of the big mines of Utah, has no superior in the country at the present time in profits and prospects. A grand total of \$3,150,000 in dividends has been paid to date. The mine has yielded nearly \$2,000,000 per annum since work fairly began, and for the year 1880 went ahead of those figures.

A NEW mining company is to be organized at Frisco, Utah, composed principally of practical miners, for the purpose of sinking a shaft 200 or 300 ft. deep, at a spot not yet determined upon. It is the belief of the best informed that proper development would show Frisco to be a second Leadville.

**THE** coinage of United States mints for January amounted to \$9,592,230, of which \$2,300,000 were silver dollars. The President has signed the bill establishing an assay office at St. Louis.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EWS

### Stirring Roasting Ores.

EDITORS PRESS:—Allow me to correct a few theoretical suggestions, made by a correspondent in the PRESS of Jan. 22d, respecting the use of wheels instead of hars in front of reverberatory roasting furnaces. Your correspondent, while saying that he thinks well of the plan, evidently considers the description of the introduction of wheels, as given in the late revised and enlarged edition of my work on "Roasting Gold and Silver Ores," as a proposed plan merely, and takes the trouble to relieve interested parties from imaginary difficulties, by suggesting improvements, ignoring facts. I first tried wheels in place of hars, in 1863, on a small furnace of 300-lb. charges, near Dayton, Nev., and, although the wheels were made only by rough blacksmith work, they proved greatly superior to the bars. Later I built, at Melrose, Alameda county, a long furnace provided with six working doors. In the middle of each door-frame was a wheel, which turned in a hole in the frame, but more toward the outside, so that when the door was shut the wheel remained outside, with the hoe in each; this obviated the constant lifting of the hoe. All roasters, who had practical experience in handling hoes, were delighted with the ease with which they could stir the ore with the aid of the wheel as compared with the bar. Subsequently I built two long furnaces in Mexico, each furnace was provided with five working doors, and these doors, having been cast in Mazatlan, were supplied with hars in front. The trouble which green Mexican roasters had caused me, induced me to replace the hars with wheels, and accordingly I ordered 10 of them at a blacksmith shop, and, not wishing to stop the roasting, the wheels were fixed outside, exactly as represented on page 68 of the treatise on "Roasting Gold and Silver Ores." The interested reader is referred to the Mexican works at Plomosas, Siuolaa, where the ore, at every point in the furnace, is conveniently stirred with all the "lateral movements of the hoe," although the wheels are attached on the front of the frame, as shown in the diagram in the book.

Finally, as to the suggested misapprehension of the sentence quoted from my book, which reads: "In place of the usual rollers in front of the working door, a far better contrivance (the wheel) allows the hoe easily to be directed to the required points, which is not the case with the roller bars"—will be readily understood by all practical men as meaning that with the wheel the hoe is easily directed, and with the bar it is not. The proposition is no longer theoretical, its soundness having been demonstrated at the works specified.

G. KUSTEL.

San Francisco, Jan. 25, 1881.

### Truckee and Quincy Railroad.

Short narrow-gauge lines will sooner or later tap the rich interior valleys, long isolated from a market, and connect them with the main railroads of the coast. On Saturday, January 1st, a large meeting was held at Sierraville, by the people of Sierra and Mohawk valleys to consider the advisability of building a narrow-gauge railroad from Truckee, Nevada county, through the valleys named, and to Quincy, Plumas county. Committees were appointed, and after full discussion of the subject, it was decided it was a needed and promising enterprise. It appears, from the Truckee Republican's report on the subject, that another meeting was held on January 3d, at which more complete statistics were offered. The proposed road extends through a section which is free from snow and landslides. No snow-sheds will be needed, nor are there such natural obstacles as would require heavy grades, deep cuts or expensive bridges. The resources to support the road are the heavy forests of Prosser creek, Sage Hen and Little Truckee, probably the best track of sugar pine in the State; the mines, present and prospective, of Independence, Mohawk valley, Plumas Buttes and other districts; and lastly, the grain, stock and other interests of large and beautiful mountain valleys, as yet but partially developed. Estimates of the freight at present to these mines and valleys place it at 40,000 to 50,000 tons annually. The prospects appear so good that a preliminary organization has been made, and stock is being subscribed in Truckee and in other towns, which will receive benefits from the success of the enterprise.

A glance at the map shows that the distance in a direct line between the terminal points of the proposed railroad is not more than 60 miles. The country to be opened up by such a line is one of the pleasantest and most healthful parts of the North Sierra region. There is no more beautiful region for tourists, hunters, botanists and lovers of the picturesque. The county of Plumas was settled at an early date, and its growth, though slow, has been steady and positive. For some kinds of fruits and for most kinds of berries, for vegetables, cereals and forage plants these mountain table-lands are unsurpassed. It is said that there are desirable openings for many more settlers on Government lands.

### Globe District.

#### Its Early History.

The Globe mining district, says the *Journal*, was organized on the 25th of November, 1875. It begins at a point where the supposed line of Los Carlos Indian reservation crosses Salt river; takes the course of the river to the mouth of Pinto creek; thence in a southerly direction to the Bloody tank on the trail from the Globe mine; thence along the summit of the timber range of the Pinal mountains to the Gila river, and up that river to the Carlos reservation.

The Pinal mountains are on the extreme north of Pinal county, and Globe district is north of this range of mountains—an admirable location—which gives it the benefit of the luxuriant growth of pine and fir timber which covers the sides of the range. Another benefit derived from these mountains is the numerous springs, which supply an abundance of water for both milling and mining purposes. If future developments should demand a larger supply, a road can easily be built to Salt river, a few miles north of Globe, where there is a sufficiency, not only for milling, but enough to furnish the power for 150 stamps. The river runs through a belt of timber, which could be cut and rafted down.

Globe has heretofore had to contend with a somewhat peculiar obstacle, and its effects have not yet disappeared. The mines

#### Have Been too Rich.

This may seem singular, but is susceptible of explanation. The reports circulated of the vast mineral wealth of the country have appeared to those unacquainted with the character of the district as little less than the dreams of an enthusiast—a mild edition of the tales of the Arabian Nights. One instance is sufficient for illustration: Some years ago, Mr. Estevan Ochoa was awarded the contract to deliver stores to the government posts in the vicinity of the district. On one occasion, while in camp, some of his mules were stolen by the Indians. He, together with his teamsters, gave pursuit. One of the latter, a Mexican, strayed into the district, and upon his return, greatly excited, he informed Mr. Ochoa that if he would come over toward the big water (referring to Salt river) he would show him a place where he could load his wagons with silver. Mr. Ochoa, supposing his teamster to be deceived, paid no attention to his offer. Some months afterward, J. C. Chilson, the discoverer of the Silver Nugget, passed down through the valley with his wagon with the

#### Almost Pure Silver Nuggets

Which had so excited the teamster. Seemingly exaggerated reports have actually driven persons away, whose aid might have greatly advanced the prosperity of the district. The means of communication in those days were exceedingly limited. Pack mules supplied the place of wagons and

#### A Horse and Saddle

Were the only facilities available for travel. A trip of 90 miles through pathless mountains was not inviting.

The opening of King's mine wrought a great change. A good wagon road was built from there to Florence, and a stage line started. A road was subsequently built from Globe to Florence, and the district was thence fairly under way. The original Globe country, as at first discovered, embraced the Pioneer district, in which is located the Silver King mine, the McMillan district, with the Stonewall Jackson mine, and the Mineral Creek, the celebrated mine of the same name. These were all parts of the same general lode, with the same geological features, which are readily traceable.

#### Mines.

In the district proper are the McMorris and the Nugget, which with the group of mines surrounding them is located in what is known as Richmond basin; the Centennial, the Stonewall, Cox & Coplin, Champion, Resene, California, Irene, Alice, South Alice and El Capitan, all of which are silver mines.

#### The Gold Belt.

Which lies west of the main silver belt, contains, among many other prominent mines, the Golden Eagle, the Townsend, parallel with the former, the one having a ten-stamp mill and the other five stamps running night and day, the Golden Gate and the Golden Star. The croppings all over the district disclose rich deposits of copper, with which the opening up of the country and the construction of railroads will doubtless be utilized. There are five mills now in operation in the district and four in course of erection. Many of the assays made from ore taken out of the mines are simply marvelous, and some of the mines have milled from \$500 to \$5,000 to the ton in lots of from 20 to 100 tons. Globe district is

#### Accessible by Three Routes.

Passengers from the west leave the cars at Casa Grande and take the stage for Florence, arriving there in time for dinner. From Florence there are two roads available. The visitor can go by Silver King, reaching the mine at 9 P. M., where he will get a good night's rest and have an opportunity to inspect that fine property. Leaving this point at 10 or 11 o'clock in the morning on horseback, he will travel 18 miles by the trail to the place where the stage line intercepts the pack train, about eight miles from Globe, reaching the town at 8 P. M. Or he may take the route by Riverside, leaving Florence at 2 o'clock P. M., and reaching Globe at 10 o'clock the next morning. By the latter

route he avoids the journey on horseback, but loses a night's rest and the chance of seeing the Silver King mine.

Passengers from the East leave the cars at Wilcox and take Stewart & Norton's stage line by Camp Grant, Camp Thomas and the San Carlos reservation to Globe. The time occupied by the trip is about the same over either route, but it is proposed, within a few weeks, to shorten the journey to 27 hours. There is little difference in the cost over any of the routes.

### New Amalgamating Works at Leadville.

#### The Taylor and Brunton Mill.

Prior to October, 1880, lead smelting was the only process of treating ore in Leadville, successfully adopted, lead ore being obtainable in sufficient quantities to mix with silicious ores and bring the percentage of lead in the mixture to the standard requisite for good smelting.

At times the supply of lead ore has been relatively very small and much uneasiness has been felt lest the production of lead-bearing ore should fall proportionately so far below the production of silicious ore, as to make it necessary to ship the latter to other cities for treatment—a course only practicable profitably for ores of the richer grades. In fact, this state of affairs had so far obtained, as to cause accumulations or "dumps" of lower grades of silicious ores, on Fryer and Carbonate hills alone, to the extent of not less than 20,000 tons; so held on the chance of their becoming salable at some future time.

There was, therefore, says the *Leadville Democrat*, needed some method other than that of lead-smelting for the home treatment of such ores, and the successful establishing of such a method, is a matter of importance and congratulation for Leadville, as well as for the lucky promoters of the enterprise.

The works for this purpose, known here as the Taylor-Brunton free amalgamating mill, were completed during the latter part of September, 1880, and are the property of the Leadville Gold and Silver Mining Co., a New York corporation, whose shareholders are principally prominent New York mining men. The designers and builders, Messrs. Taylor & Brunton, do not claim any patent process, but only an adaptation of the latest mill science, as known in Nevada and California, where such mills have been in steady use for many years, notably in Virginia City, Nevada. These gentlemen have been for ten years practically engaged in building, running and superintending mills in Nevada and Colorado, and are well known to most of the prominent men in the West, as thoroughly competent and experienced managers.

The Leadville Gold and Silver Mining Co.'s works are built in California gulch, on the line of the Denver & Rio Grande railroad, one-quarter mile below the city limits. This mill-site contains five acres well adapted to the business, securing a good contour for buildings, as well as bottom land for storing tailings, a full supply of water all the year, and reliable railroad communication via the Denver & Rio Grande railroad, which has run a side track to the center of the company's works, and there deliver coal and ores without transfer.

The improvements, besides the mill, consist of a comfortable dwelling, containing general business and assay offices; a stable and watchman's room adjoining; 2 ore sheds 18x92 ft.; coal platform with chute to boiler room; and blacksmith and carpenter's shop, completely fitted up for light machine work, such as gas-pipe cutting, hot mauling, etc. All these buildings cover 15,118 square ft., and are substantially built and roofed with iron.

The mill itself is put up on the terrace or "gravity" plan, the movement of ore in process of treatment being always down. The milling machinery was made by Prescott, Scott & Co., the prominent manufacturers of milling and mining machinery in San Francisco, after the latest patterns.

The method of treatment adopted is known as wet crushing, free amalgamating, and, as working in the Taylor-Brunton mill, may be described as follows, viz: The ore run from the receiving ore sheds, in a car of 1,000 lbs. capacity, is weighed enroute and dumped through Blake rock breakers, which crush to egg size, into a 50-ton storage bin, behind and above the stamp batteries. Close under the breakers' discharge, cutting the falling stream of ore 10 times per minute, there sweeps a small pan on the outer end of a three-ft. radial arm. The pan travels on a circular iron track, and on making a half circle from the crusher, upsets and dumps the ore caught in it from the stream under the crusher, into a large box, to be kept as a sample, showing the value of the ore run.

From the large storage bin the ore is fed to the stamps by automatic feeders, carried under them by a stream of water, and when crushed fine enough to pass through a hole made by a No. eight sewing needle, carried by the same stream of water out of the battery through the sizing screens into a series of 18 settling tanks, each 6x7 ft. and four ft. deep. From the last tank the water flows almost clear, and is pumped up to the stamps again for reuse. After the water is drawn off, the fine ore settled in the tanks, and resembling mud, is shoveled into the amalgamating pans.

The 20 stamps are arranged in four batteries, of five stamps each, with high double-discharge mortars. Each five-stamp battery runs independent of the others, driven by a separate friction pulley, which admits of the instantaneous starting and stopping of the battery. The

foundations and frames of all the hatteries are, however, connected both above and below, to distribute the vibration and give firmer and better resistance to the jar of the stamps, each of which weighs 850 lbs., and falls seven inches 82 times per minute. The 20-stamps crush from 40 to 100 tons in 24 hours, fine enough to pass through No. eight diagonal slot screens—screens for wet batteries are numbered in sizes the same as sizes of sewing needles.

By the concussion and grinding unavoidably following the frequent tremendous blows of the stamps, the striking surfaces, i. e., shoes and dies, are rapidly worn away and the drop of the stamp grows greater. To ascertain and regulate the amount of drop, it has been customary to remove the screens, clean out the mortars and block up the stamps from below to the requisite height, then setting them after two or three hours loss of time and labor. In the Taylor & Brunton hatteries a simple little machine saves this trouble, and without any stoppage of the batteries, tests and registers the "drop" of each stamp as fast as the register can be read. Some other improvements in these hatteries, such as balanced thrust of cam shafts, increased facility in reversing stems, etc., are too technical for description here.

The amalgamating pans are 10 in number of "Eclipse" pattern, five ft. in diameter and 40 inches deep, with steam bottoms to utilize the heat of the exhausted steam from the engine. This is found entirely sufficient to heat the pulp, and no live steam is required for that purpose. Into these pans the pulp (mud) from the settling tanks, in lots of 3,500 lbs., is charged and ground for some time, until fine end warm enough for the addition of the quicksilver. On putting the quicksilver into the pans, the mulers are raised and amalgamation commences, continuing until the precious metals are absorbed by the mercury. At this point the pan is tapped and its charge drawn down into a settler—an eight-ft. diameter tub—and the pulp made thin by adding water. The slow stirring of the settler keeps the mud in suspension in the water, but allows the heavier particles of amalgam and quicksilver to sink to the bottom where they are collected into a deep groove, running from the center of the settler to the outer edge of the bottom. From this groove the amalgam and quicksilver run in gas pipe to the securely-locked "amalgam safes," in which the surplus "quick" is strained off and the amalgam kept out of the reach of specimen hunters. From the settlers the muddy water and fine rock is drawn off into the "tailings sluice," and thrown away.

Each morning the amalgam from the straining sacks, inside the "safes," is emptied into a little car, weighed thereon and carried by it into the retort and smelting building. Nearly 1,000 lbs. of amalgam is charged into a retort—a heavy cast iron tube of 12 inches diameter, tamped at one end by a small gas-pipe—which is tightly closed and heated enough to vaporize the quicksilver contained in the amalgam. The quicksilver vapor passes out through the gaspipe into the "condenser," and by exposure to cold, changed back to its liquid state and ready for use again in the amalgamating pans. When the retorts cool, the now volatile gold and silver are taken from them, melted in plumbago pots and cast in iron molds, into ingots ready for shipment, by express, to the mint.

The system adopted to avoid handling the quicksilver is quite interesting. At the side of each of the ten amalgamating pans, is a little cast iron tank with quicksilver in it ready for use when wanted. At the proper time a faucet is opened and the "quick," drawn into the pan, and by the rapid stirring of the mulder, it is disseminated in small particles, all through the warm pulp, assimilating its precious metal contents. This duty accomplished, the pan charge is drawn into the settlers and thinned down, and the reverse operation commences. The slow motion in the settler allows the small particles of "quick" to settle and reunite. As fast as it collects the "quick" passes by an inverted syphon to the strainers, where it is divided, a portion going through the retorts as before described, and returning from the condensers to the pump well, and the rest separated by straining, is also collected by pipes into the pump well, whence it is pumped up back to the supply tanks near the pans.

The motive power for the mill is supplied by a 225 horse-power Buckeye automatic cut-off engine, coupled direct to the pan line shaft. A pair of Otis steel boilers 14 ft. by 54 inches, with every modern addition for saving fuel and increasing their durability, furnish steam for the engine and pumps. So far as the consumption of fuel carried that it is a rare thing to see any smoke coming from the boilers, though they are fired steadily with Canyon coal.

The mill throughout is scrupulously clean and orderly. It is well ventilated and sunshiny, even under the pans, where the gears and shafting run so quietly as not in the least to interfere with conversation.

**RICH ORE.**—The Taylor vein in the Concordia mine, lying 89 ft. west of the Concordia vein, and which was more fully described in these columns on the 7th instant, is growing larger and even richer as it goes northward. A sample taken from the north drift on Tuesday gave the following assay: Gold, \$4,731.67; silver, \$3,345.81. Total, \$8,077.67. The ore from this vein is being carefully sacked and stored at the Red Cloud works—*Bodie Free Press*.



## MECHANICAL PROGRESS.

## The Lead Bath in Tempering.

The employment of melted lead for heating steel articles preparatory to hardening is becoming much more common than formerly. Years ago melted lead was resorted to only when the article to be hardened was small in bulk and thin, or when the article was of greatly varying thickness. But as handiness in use came with experience the lead bath became a common means of getting the proper heat on articles of unvarying form and of quite a large size. The taps and dies which are produced in large quantities by some concerns manufacturing to order or for the general market, are now generally heated in the lead bath instead of over a charcoal fire. From the lead bath the articles come so clean and clear that the experienced operator does not require an after polishing to prepare for the drawing or tempering process even when the cooling bath is oil instead of water; the color being as well defined as when the hardened article is polished. The oil is readily removed by a momentary immersion in potash or soda water.

But it is necessary that the lead bath be of clean, pure lead; that made from the commercial pig is the best. It will not do to use old pewter, Rabbitt metal, or even old lead pipe. The bath should be made in a black lead or plumbochrome, or a pot made of boiler-iron or heavy sheet iron, and the lead should be brought to a blood-red color and kept there. To prevent oxidation and consequent waste the surface of the lead should be covered. Where the articles to be heated are of nearly uniform size plate of cast or wrought iron about a quarter of an inch, or even less, in thickness, may be placed on the surface of the melted lead, being of size and shape to nearly cover the lead, and through this plate may be made a hole sufficiently large to admit the articles held in a pair of tongs or suspended by a rod. Where the bath is to be used for articles of varying shape and size a thick sprinkling of charcoal dust is a good protection. If the bath is kept up at a good red heat it is surprising how soon its heat will be imparted to quite a large piece of steel. The process is a saving of time over that of the charcoal fire, and has the still greater advantage of producing a "suan" and even heat.

The chilling may be, of course, in water, a pickle, or oil, as the nature of the work requires. When the drawing or tempering is not done by the sand bath, the open fire or red-hot iron, it may in many cases be advantageously done by the lead bath itself. This is especially the case when some portion of an article wholly hardened, requires not temper but softness. Instances of this character are in the treatment of springs, a portion of which should be left soft, as when they are to be after worked for use. The lead bath will soften just that portion immersed without affecting the article for any further perceptible distance, as the bath heats the steel very rapidly without affecting the unimmersed portion. In thus softening over a fire the radiant heat affects the tempered article beyond the point desired. Springs of hardened brass wire may thus be softened where a portion is to be bent or riveted. A momentary immersion of the portion to be softened, and then a dip in cold water, will at once remove the spring-like rigidity of the wires.

There are many occasions not necessary to specify, when the lead bath will be found very handy. Every machine shop should keep a pot of clean lead on hand and ready for heating. Even in jobbing business and in the tempering of taps, drills, reamers, and even turning tools and planer cutters, the lead bath is a great convenience.—*Boston Journal of Commerce.*

**STUFFING BOXES.** Whether for the piston or valve stems, need to be looked after carefully, and to prevent leaking will require tightening from time to time. There are several kinds of ready-made packing in the market containing rubber, canvas, soapstone, asbestos and other substances which form the basis of a good durable packing. These can be had in sizes suitable for all ordinary purposes, and their use is recommended. In the absence of any of these, a packing made of clean manilla or hemp fiber will serve a useful purpose. Formerly it was the only substance used, but is being gradually superseded by the other kinds mentioned above. In packing the small and delicate parts, such as a governor stem, a good packing is made by plaiting together three or more strands of cotton candle wick. This is soft, pliable, free from anything like grit, and will not get hard until soaked with grease and baked into a brittle fiberless substance not easily described.

**MR. ABERNATHY** says that when upright posts are used, as is frequently the case in mills, to support the shaft, they should be secured with keys, top and bottom; the bottom keys to level up with, and the top keys to tighten with. By this kind of an arrangement the man in charge, when he finds his shaft getting out of level, can loosen the top keys, place his spirit level on the shaft, and drive up the bottom keys until it is right, tighten up the top keys and go ahead again.

**THE PHILOSOPHY OF WELDING.**—If iron were similar to other bodies, and a blow or sudden pressure produced heat all through the mass, the unexpanded liquid at the surface, as well as the interior plastic iron already expanded, would rise in temperature, the consequence of which would be that the molecular conditions at the junctions would still differ, although both at a higher temperature, and, therefore, molecular union could not take place. But if the liquid iron at the surface of the weld is in that condition of temperature that it would cool by pressure, the result is different, as the blow or pressure acts on this plastic iron to produce heat, and on the surface iron—which is on the borderland between liquidity and plasticity—to produce cold; consequently there is a moment when the temperature of the two would meet each other and render the molecular condition of the junction uniform and continuous. This appears to be a satisfactory explanation of the wonderful property of welding iron, and its counterpart in ice is the interesting phenomenon of regelation.—*L'Ing. Univ.*

**DURABILITY OF RAILS.**—The tests of the durability of steel rails on the Great Northern Line of England, show that the hardest rails do not wear the best. In one instance a hard rail was worn away one-sixteenth of an inch by a traffic amounting to 5,251,000 tons. A softer rail near by was worn the same amount by 8,402,000 tons. In another instance the total was 15,531,000 tons for a hard rail, and 31,661,000 for a soft rail, the wear and tear being the same—one-sixteenth of an inch. Analysis showed this last rail to consist of 99.475 per cent. of iron and minute quantities of carbon, phosphorus, silica, manganese, sulphur and copper.

WHEN a bar or rod becomes crooked, straighten it by pressure rather than by blows. The common way of allowing the bar to have its only bearing on the anvil is manifestly improper, as the suspended weight receives the full impact of the blow, and is effected in its entire length. The result is to compel the impact of the straightening blow to lift the entire dependent weight of the bar, thus adding to the force of the blow the inertia of this bar. The result, it is apparent, is a terrible straining of the bar just at the point of the blow of the hammer. There are several appliances for straightening shafting, bars, etc., in the market, which answer the purpose well.

**PREVENTING THE EXPLOSION OF STEAM BOILERS.**—An invention has recently been patented to prevent the explosion of steam boilers by placing a partition across the boiler slightly above the water line, providing an opening through this partition, which is adjustable, and through which the flow of steam can be regulated to be equal to the average intermittent flow required for the engine. It is claimed that this prevents dangerous variations of pressure on the surface of the water, hence preventing explosions. It is an American invention.

**MR. JOSHUA ROSE** says that an efficient method of locating a "pound" in a steam engine, is to place one end of a piece of 4-inch wire about eight inches long, between the teeth, applying the other end to each end of the crank shaft, hoarings, cylinders, etc., the violence of the shock in the vicinity of the pound being sufficiently the greatest to indicate its whereabouts. Mr. Rose remarks that all the mysterious "pounds" that annoy the engineer may be traced to a want of truth in the crank-pin, or a want of being in line of the main parts of the engine, usually the cylinder and main shaft.

**STEAM JACKETS.**—In order to secure the advantage of steam jacketing it is not sufficient to merely place around the cylinder a casing which may contain steam, care must be taken that this jacket always does contain steam. In other words, means must be provided for keeping the jacket clear of water and air. Too many jackets are "steam" jackets only in name, and hence the contradictory testimony which has arisen regarding their action. Few but those who have actually tried it fully appreciate how soon a jacket may be rendered ineffective by the accumulation of air and water.

**ALLOYS.**—Kraft's alloy for medals and coins—a composition which melts at 104° C; bismuth 5, lead 2, tin 1. Homberg's alloy for same, melting at 122° C; bismuth 3, lead 3, tin 3. Rose's alloy for same, melting at 93° C; bismuth 2, lead 2, tin 2. An amalgam to varnish plaster casts is made of tin 1, mercury 1, bismuth 1. The mercury is added to the molten metals, well united by stirring, and rubbed through the white of an egg. It forms a liquid mass, which is laid on with a small brush.

**AN IMPROVEMENT** on the furnaces of steam boilers has been patented at Birmingham, England, by which the bridging wall has openings upon the fireside with a hollow connection with the steam pipe or air pipe, which is led under the grate. A jet of steam is driven through the pipe under the grate which draws in air with it, and the whole is forced through the openings in the front side of the bridge wall. The idea being to ignite the unconsumed gases, making a very effective flame.

**MR. A. SHIELDS**, of St. Louis, is said to have discovered a process of converting Missouri pig iron into steel, which promises to be of great utility.

## SCIENTIFIC PROGRESS.

## Opinions as to the Origin of Petroleum Oil.

The manner of the formation of the deposits of mineral oil that occur so abundantly in this and other countries, is still involved in some doubt. The only statement that may safely be made concerning it, is that it is a product of the decomposition of animal or vegetable matter of former geological epochs. Some regard it as the product of the decomposition of land or marine plants; others, that it has been produced by the decomposition of animal matter; others again, that it is a species of coral oil, not formed by the bodies of the coral polyps, but sequestered by corals, principally of the Devonian age; others, that it is distilled from bituminous shales by subterranean heat, the shales being made up of the mud of lakes and estuaries that were once largely filled with vegetable and animal debris. Other authorities again, think that the true solution of the problem is not to look to one source only for the origin of petroleum. Dr. Lawrence Smith, for example, in discussing this subject, asserts that there can be no doubt that the primal sources of petroleum were both vegetable and animal; that the Pennsylvania and Virginia petroleum was derived almost exclusively from vegetable decomposition; and that those of Canada, and of Kentucky and Illinois, were derived principally from animal matter.

How the transformation of animal or vegetable matter into petroleum was effected, we do not know, further than that temperature and pressure were important factors in the operation. Prof. Peckham supposes that petroleum is the normal or primary product of the decomposition of animal or vegetable organism—chiefly the former—and that nearly all other varieties of bitumen are products of a subsequent decomposition of petroleum. Prof. Lesquereux attributes its origin to the partial decomposition of low forms of marine vegetation. The first named savant again affirms his conviction that the remains of animal life have contributed much more largely to the formation of petroleum than has generally been supposed; and further, that the different varieties of petroleum are largely due to the varied forms of animal life existing during the different geological epochs to which the rocks belong from which oil primarily issues. Dr. Sterry Hunt, a high authority, entertains similar opinions. He holds that the presence of the petroleum oils of Pennsylvania and Canada in the lower palaeozoic rocks, which contain no traces of land plants, shows that they have not in all cases been derived from terrestrial vegetation, but may have been formed from marine plants or animals. The latter view, he adds, is not surprising when we consider that a considerable portion of the tissues of the lower marine animals is destitute of nitrogen, and very similar in chemical constitution to the woody fiber of plants.

These abstracts of the opinions of eminent authorities will suffice to show that there is still considerable uncertainty as to the exact method by which petroleum has been formed. While some differences exist, however, in respect to the *modus operandi* of its formation, it will nevertheless be observed that all these authorities are agreed that petroleum is a product of the decomposition of organisms that have lived in early geological epochs. Beyond this fact, nothing has yet been determined with certainty. It may be added, in conclusion, that M. Berthelot, a distinguished French chemist, has presented an ingenious hypothesis in which he attempts to show that petroleum may have had a purely mineral origin; but his argument, though plausible, has found no supporters.—*Manufacturer and Builder.*

**PHOTOGRAPHS OF NEBULÆ.**—Janssens, in congratulating Draper upon his successful photograph of the nebula in Orion, recommends that the greatest possible number of photographs should be taken, in different observatories where there are suitable instruments and skillful observers, in order to provide for a systematic study of nebular changes. He has made preparations accordingly at Mendon, and he proposes to construct, upon a large scale, a telescope similar to the one with a very short focus with which he obtained, in 1871, a very luminous spectrum of the corona.—*Comptes Rendus.*

**NERVOUS VELOCITY IN THE LOBSTER.**—Fredericq and Vaudevel have been experimenting upon the velocity of transmission of the motive excitement in the nerves of the claw of the lobster. They used the graphic method, which was employed by Helmholtz in his researches upon the propagation of the nervous motor influences in the frog. In the winter experiments, at Ghent, with a temperature of 50° to 53° F., they found a velocity of about 20 ft. per second. In the summer experiments, with a temperature of from 62° to 68° F., they found velocities of from 33 to 40 ft. per second.—*Comptes Rendus.*

**THE TELESCOPE IN THE CELLAR.**—The late Prof. Watson, of the University of Wisconsin, was engaged, just before his death, in the experiment of gazing at the stars down cellar, on the principle that stars can be seen at noonday from the bottom of a deep well. He built his fine new observatory over a cellar 20 ft. deep, into which the light of the heavenly bodies was to be thrown down a large tube by powerful reflectors on a neighboring hill.

## Oil From Grape Seeds.

M. T. Fleury, of Bordsaux, France, has explained the method by which a very valuable oil is obtained from the kernels of the grape. The refuse left after distilling brandy or making verdigris is dried and ground fine in an ordinary mill, the yield of oil being in direct proportion to the fineness of the grinding. Some manufacturers first press without heat, obtaining about 5% of oil; afterwards the stuff is heated and pressed, with a yield of 10 or 15% more oil. The oil is of a light yellow color, and in course of time obtains a density of .9202 at 59° Fahr., and solidifies at 3° Fahr. Although it does not coagulate as soon as other oils, it becomes rancid and viscid when exposed to air, and although it saponifies readily, the soap produced lacks hardness and density.

Black grapes contain much more oil than white grapes, and the kernels of grapes from vines in full vigor yield more oil than from very young or very old vines. Generally black grapes give 15% to 18% of oil; white grapes 10% to 14%. It is probable that American vines, especially those of California, yield more oil than French vines. In the south of France 25 lbs. of kernels are allowed for 25 gallons of wine. It is easy to estimate the quantity of oil that is annually lost in grape-producing countries. The extraction of oil from grape kernels is by no means new. M. Fleury says that in 1880 there was a grape oil factory at Olby, which had been long in operation. Bergamo, Italy, produced the oil in 1770, and Roms and the vicinity of Ancona before 1782. It was also made in Naples on a commercial scale in 1818, and in Germany before 1787. The oil is sweeter than nut oil and remains fluid at a lower temperature. When burned in lamps it gives a bright, smokeless and odorless flame.

**A DISCOVERY IN THE POWDER LINE.**—The result of an important discovery was recently exhibited at Jersey City. It has been ascertained that the explosive quality in gunpowder may be temporarily removed by adding and thoroughly mixing in three times its weight of powdered glass. On the occasion referred to above, the gentleman conducting the experiment thrust a red-hot poker into a quantity of the powder so prepared, the only result being a steady and harmless combustion, as if so much punk had been ignited. The addition of four parts of glass to one of powder very nearly destroyed the properties of the powder, for saving that coming into immediate contact with the iron, none burned. The value of the discovery lies in the fact that upon subsequent sifting in a sieve, so as to eliminate the glass, the explosive quality of the powder is found to be apparently unchanged. It is claimed that the danger in handling, transporting and storing is entirely obviated. A fear seems to be entertained, however, that the use of powder, which has previously been thus treated, in shot-guns may tend to foul the guns. No assurance on this head is advanced by the parties most interested. The explanation of the above curious discovery is purely mechanical. The glass holds away one grain of powder from another in such a manner that simultaneous ignition is prevented. The above method of rendering powder in explosive has long been known, but some of the facts cited in connection therewith are both new and interesting.

**LIGHT AND ELECTRICITY.**—In 1874 W. C. Röntgen was led by observing that a glass plate which had been fractured by the electric spark become doubly refracting, to inquire whether a similar influence might be exerted by electricity without fracture. Kerr, Gordon and Mackenzie subsequently published a series of experiments upon the subject, none of which seemed very conclusive until Kerr's communications appeared in the *Philosophical Magazine* for 1879. Röntgen was then induced to experiment with various substances, and he found that transmitted light undergoes changes through electric influences which are precisely similar to those of ordinary double refraction. The intensity varies in the electrical field with the electrical force, and it increases with the difference of potential between the electrodes. By these experiments he has succeeded in thoroughly confirming the classification of fluids as positive and negative.

**RELATIONS BETWEEN CHEMICAL MASS AND HEAT OF COMBINATION.**—Berthelot finds that the elements which belong to any group, when they unite with any given simple body in order to form comparable compounds, set free quantities of heat which vary inversely with the chemical mass; the stability of the compound decreases in the same ratio. The decrease sometimes extends even to the change of volume which is produced by the combination of solid elements, when they form a solid compound. We are thus enabled to investigate the mechanical significance of the various relations.—*Comptes Rendus.*

**ADVANTAGES OF STEEL.**—Dr. Siemens, whose thorough competence is universally known, claims that in every case when strength and magnitude are both required the use of steel is without a rival. He asserts that even for an ordinary house steel gives more security than wood, is six to eight times as strong, and costs less. He thinks that before many years elapse we shall see steel introduced into buildings of all kinds, and that it will gradually supplant iron, in the same way that iron already tends to take the place of wood.—*L'Echo Industri.*



Table of Highest and Lowest Sales in  
S. F. Stock Exchange.

Name of Company.	Week Ending Jan. 13.	Week Ending Jan. 20.	Week Ending Jan. 27.	Week Ending Feb. 3.
Alpha.....	31	31	31.10	31.15
Alta.....	11	11	1.05	1.10
Andes.....	1.40	1.17	1.40	1.20
Alps.....	40c	25c	30c	40c
Argentine.....	15c	15c	15c	15c
Atlanta.....	15c	15c	15c	15c
Arora Tunnel.....	15c	15c	15c	15c
Baltimore Con.....	15c	15c	15c	15c
Belcher.....	15c	15c	15c	15c
Belmont.....	15c	15c	15c	15c
Best & Belcher.....	15c	15c	15c	15c
Bullion.....	1.55	1.05	1.65	1.15
Bochelt.....	80c	85c	75c	80c
Belle Isle.....	35c	35c	35c	35c
Bodie.....	55c	55c	55c	55c
Benton.....	60c	50c	50c	55c
Bulwer.....	12	11	11	11
Boyle.....	10c	25c	25c	25c
Black Hawk.....	10c	25c	25c	25c
Bellevue.....	10c	25c	25c	25c
Booker.....	10c	25c	25c	25c
Caledonia.....	30c	25c	25c	25c
California.....	1.35	1.15	1.20	1.15
Chollar.....	1.55	1.70	1.90	1.70
Confidence.....	2.20	2.20	2.60	2.35
Con Imperial.....	15c	10c	15c	10c
Con Virginia.....	21	1.90	2.10	2.10
Crown Point.....	75c	55c	55c	55c
Con Washoe.....	60c	50c	50c	45c
Champion.....	1	85c	1.05	1.95
Concordia.....	1	85c	1.05	1.95
Dayton.....	1	85c	1.05	1.95
DeFrees.....	1	85c	1.05	1.95
Dancy.....	1	85c	1.05	1.95
Day.....	15c	25c	10c	25c
Eureka Con.....	21	20	20	21
Exchange.....	1.30	1.15	1.40	1.15
Endowment.....	5c	5c	5c	5c
Gen Thomas.....	1	1.45	1.35	1.40
Grand Prize.....	1	1.45	1.35	1.40
Gila.....	1	1.45	1.35	1.40
Golden Charlotte.....	35c	80c	1.20	95c
Golden Terra.....	3.45	3.15	3.60	3.40
Goodshaw.....	4.10	3.40	3.80	3.55
Gould & Curry.....	3.45	3.15	3.60	3.40
Hale & Norcross.....	4.10	3.40	3.80	3.55
Hillside.....	1	85c	1.05	1.95
Highbridge.....	1	85c	1.05	1.95
Homestake.....	1	85c	1.05	1.95
Hussey.....	1	85c	1.05	1.95
Independence.....	1	85c	1.05	1.95
Jackson.....	1	85c	1.05	1.95
Joe Seaton.....	1	85c	1.05	1.95
K K Con.....	1	85c	1.05	1.95
Kentuck.....	1	85c	1.05	1.95
Kessuth.....	1	85c	1.05	1.95
Keystone.....	1	85c	1.05	1.95
Lady Bryan.....	1	85c	1.05	1.95
Lady Wash.....	1	85c	1.05	1.95
Leopard.....	1	85c	1.05	1.95
Leviathan.....	1	85c	1.05	1.95
Leeds.....	1	85c	1.05	1.95
Lee.....	1	85c	1.05	1.95
May Belle.....	1	85c	1.05	1.95
Madison.....	1	85c	1.05	1.95
Martin White.....	1	85c	1.05	1.95
McClinton.....	1	85c	1.05	1.95
Meadow Valley.....	1	85c	1.05	1.95
Mexican.....	1	85c	1.05	1.95
Mides.....	1	85c	1.05	1.95
Morning Star.....	1	85c	1.05	1.95
North Con.....	1	85c	1.05	1.95
New York.....	1	85c	1.05	1.95
Northern Belle.....	1	85c	1.05	1.95
New Coso.....	1	85c	1.05	1.95
Nevada.....	1.55	1.55	1.55	1.55
Oberlin.....	1	85c	1.05	1.95
Ophir.....	1	85c	1.05	1.95
Oriental.....	1	85c	1.05	1.95
Overman.....	1	85c	1.05	1.95
Parish.....	1	85c	1.05	1.95
Phenix.....	1	85c	1.05	1.95
Phil Sheridan.....	1	85c	1.05	1.95
Potosi.....	1.95	1.15	2.30	1.90
Prospect.....	1	85c	1.05	1.95
Raymond & El.....	1	85c	1.05	1.95
Richer.....	1	85c	1.05	1.95
Rock Island.....	1	85c	1.05	1.95
Rock Patch.....	1	85c	1.05	1.95
Rough & Ready.....	1	85c	1.05	1.95
Sage.....	1.55	1.35	1.15	1.10
Sage Belcher.....	1	85c	1.05	1.95
Sierra Nevada.....	1	85c	1.05	1.95
Silver Hill.....	1	85c	1.05	1.95
Silver King.....	1	85c	1.05	1.95
Silver Prize.....	1	85c	1.05	1.95
Succor.....	1	85c	1.05	1.95
Summit.....	1	85c	1.05	1.95
Sycamore.....	1	85c	1.05	1.95
Solid Silver.....	1	85c	1.05	1.95
South Bodie.....	1	85c	1.05	1.95
South Standard.....	1	85c	1.05	1.95
Star.....	1	85c	1.05	1.95
St. Louis.....	1	85c	1.05	1.95
Syndicate.....	1	85c	1.05	1.95
Tioga Con.....	1	85c	1.05	1.95
Tiptop.....	1	85c	1.05	1.95
Trojan.....	1	85c	1.05	1.95
Union Con.....	1	85c	1.05	1.95
Utah.....	1	85c	1.05	1.95
Vermont Con.....	1	85c	1.05	1.95
Ward.....	1	85c	1.05	1.95
Wells-Fargo.....	1	85c	1.05	1.95
Woodville.....	1	85c	1.05	1.95
White Cloud.....	1	85c	1.05	1.95
Yellow Jacket.....	2.40	2.15	2.05	2.15

## Sales at S. F. Stock Exchange.

Wednesday A. M., Feb. 3.	850	Abion.....	25c
745 Alta.....	75c	Argenta.....	30c
475 Andes.....	1.10	Ardena.....	30c
150 Benton.....	40c	Bodie.....	55c
155 Bullion.....	1.40	Bochelt.....	70c
75 Belcher.....	85c	Belle Isle.....	35c
350 B & Belcher.....	60c	Bodie.....	55c
215 California.....	1.10	Booker.....	15c
20 Confidence.....	2.40	Concordia.....	35c
50 Challenge.....	25c	Champion.....	40c
100 Caledonia.....	20c	Goodshaw.....	1.10
100 Concordia (Va.).....	1.40	Grand Prize.....	1.10
400 Con Virginia.....	1.05	Head Center.....	3.95
600 Crown Point.....	1.15	Hale & Norcross.....	2.95
100 Chollar.....	1.15	Jackson.....	25c
100 Exchange.....	1.10	Mayflower.....	40c
330 Hale & Norcross.....	2.40	Monro.....	1.10
100 Julia.....	1.40	Mr Diabolo.....	3.90
555 Justice.....	45c	Northern Belle.....	35c
70 Kentuck.....	1.10	Northern Belle.....	35c
355 Mexican.....	1.40	No Noonday.....	1.60
450 Overman.....	1.40	No Noonday.....	1.60
335 Ophir.....	1.40	No Noonday.....	1.60
50 Occidental.....	25c	Oro.....	2.90
50 Potosi.....	1.10	Star.....	1.10
225 Savage.....	80c	Star.....	1.10
300 Scorpion.....	80c	Star.....	1.10
1320 Silver Hill.....	1.40	Star.....	1.10
525 Sierra Nevada.....	1.40	Star.....	1.10
185 Union.....	1.40	Star.....	1.10
100 Ward.....	1.40	Star.....	1.10
635 Yellow Jacket.....	1.60	Star.....	1.10

The new 40-stamp mill of the Saverool mine, Butte Co., has been completed, and is now running. The company have an abundance of ore that can be brought to the mill at little expense. The yield has been about \$6 per ton, but no care was taken of the sulphurets, which it is thought will increase the yield to about \$10.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

## ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta M Co	Nevada	19	50 Jan 6	Feb 10	Mar 2	W H Watson	302 Montgomery st
Bullion M Co	Nevada	17	50 Dec 14	Jan 17	Feb 7	J M Brazell	328 Montgomery st
Belmont M Co	Nevada	27	10 Dec 18	Jan 24	Feb 21	J W Pew	310 Pine st
Bechtel M Co	Cal	7	15 Dec 3	Jan 10	Jan 31	W H Lent	309 Montgomery st
Bullion M Co	Nevada	17	50 Dec 14	Jan 17	Feb 7	J M Brazell	328 Montgomery st
Con Imperial M Co	Nevada	14	10 Jan 13	Feb 18	Mar 11	W B Dean	309 Montgomery st
Golden Fleece M Co	California	19	30 Dec 19	Jan 22	Feb 5	F Sherman	755 Folsom st
Crown Point M Co	Nevada	44	50 Dec 28	Feb 2	Feb 23	J Newlands	327 Pine st
Excelsior Deep Gravel M Co	California	14	25 Dec 28	Jan 29	Feb 14	D B Chisholm	377 Pine st
Harrington M Co	California	2	5 Dec 28	Feb 3	Mar 2	C O Miller	324 Pine st
Hale & Norcross M Co	Nevada	67	75 Dec 8	Jan 13	Feb 28	J F Lightner	Montgomery st
Head Center M Co	Arizona	11	30 Dec 31	Jan 20	Feb 28	J W Pew	310 Pine st
Julia Con M Co	Nevada	14	30 Dec 15	Jan 20	Feb 8	H L Charles	410 California st
Mexican M Co	Nevada	14	50 Jan 17	Feb 21	Mar 14	C L McCoy	309 Montgomery st
Monro M Co	California	10	50 Dec 28	Feb 2	Feb 23	W H Lent	309 Montgomery st
Potosi M Co	Nevada	5	50 Dec 10	Jan 14	Feb 5	W B Dean	309 Montgomery st
Spanking M Co	California	1	10 Dec 15	Feb 15	Feb 15	F Hein	117 Battery st
Swamp Angel M Co	Nevada	2	07 Jan 10	Feb 16	Mar 5	C W Badger	320 Sansome st
Sierra Nevada M Co	Nevada	67	1 07 Jan 7	Feb 10	Feb 28	E L Parker	309 Montgomery st
Tellurium M Co	California	24	10 Dec 3	Jan 5	Feb 28	J M Littlefield	425 Montgomery st
Yellow Jacket M Co	Nevada	40	1 00 Jan 7	Feb 8	Mar 18	M Oley	Gold Hill

## OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Bald Mountain Extension M Co	Cal	1	03 Jan 13	Feb 16	Mar 10	J W Orear	Downsville
Commonwealth Con M Co	Cal	4	10 Nov 12	Feb 14	Mar 8	Chas A Morse	217 Sansome st
Columbia Smelting M Co	California	1	10 Dec 15	Feb 2	Mar 27	D Maracovich	408 California st
Rocky Point M Co	California	1	10 Dec 15	Feb 2	Mar 27	C J Conner	227 Montgomery st
El Tesoro M Co	Lower Cal	9	25 Dec 8	Jan 18	Feb 8	W H Chickering	214 Sansome st
Flowers M Co	Nevada	4	10 Dec 18	Jan 20	Feb 10	W W Stetson	309 Montgomery st
Hillside M Co	Nevada	4	1 00 Dec 17	Jan 21	Feb 14	F Frankenthal	cor Battery & Cal st
Headlight M Co	California	4	10 Jan 11	Feb 14	Mar 7	A W Rose	302 Montgomery st
Homer M Co	California	30	Jan 26	Feb 28	Mar 28	W F Hughes	330 Pine st
Howe M Co	Nevada	2	10 Jan 31	Mar 12	Apr 4	A Adler	76 California Market
Iowa M Co	Nevada	12	05 Jan 17	Feb 21	Mar 16	C O Leavitt	411 California st
Jupiter M Co	California	11	25 Dec 19	Jan 12	Jan 31	E C Masten	309 Montgomery st
Martin White M Co	Nevada	8	25 Dec 17	Jan 26	Feb 23	J J Souville	309 Montgomery st
Mayflower Tunnel M Co	Cal	6	10 Dec 8	Feb 19	Feb 19	W J Taylor	310 Pine st
May Flower G M Co	California	10	10 Jan 13	Feb 21	Mar 15	J Morizo	323 Montgomery st
McMillan M Co	Arizona	3	20 Jan 12	Feb 24	Mar 21	J Morizo	323 Montgomery st
Nevado M Co	Nevada	7	20 Dec 11	Jan 17	Feb 8	E M Hall	327 Pine st
Northern King M Co	Arizona	5	15 Jan 10	Mar 23	Mar 21	A A Holmes	315 Pine st
New York M Co	Nevada	25	10 Feb 1	Mar 23	Mar 23	D Thomas	325 Pine st
Red Cloud Con M Co	Cal	9	15 Dec 8	Jan 13	Feb 7	W J Taylor	310 Pine st
Rowe M Co	Arizona	2	03 Dec 22	Jan 22	Feb 21	S D Rodgers	328 Montgomery st
Red Del Monte M Co	Nevada	14	25 Jan 31	Mar 5	Mar 28	C V Hubbard	310 Pine st
Rocky Point M Co	California	6	05 Jan 21	Feb 23	Mar 14	W G Hughes	330 Pine st
Utah S M Co	Nevada	33	20 Jan 7	Feb 9	Feb 28	G O Pratt	309 Montgomery st

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Holmes M Co	Nevada	E A Holmes	318 Pine st	Annual	Feb 8
North Fresno M Co	California	W H Allen	309 Pine st	Annual	Feb 7
Northern King M Co	Arizona	E H Holmes	318 Pine st	Annual	Feb 14
Prospect M Co	Nevada	H P Bush	Merchant's Ex	Annual	Feb 8
Standard M Co	California	W Willis	309 Montgomery st	Annual	Feb 7
Telford M Co	California	J Pentecost	712 Market st	Annual	Feb 8
Wide Awake M Co	California	C Hildebrandt	523 Sutter st	Annual	Feb 9

## LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Jan 20
Indian Queen M Co	—	Grove Adams	Merchants' Ex	10	Oct 26
Napa Con Quicksilver M Co	California	W W Farris	330 Pine st	10	Oct 30
Northern Bell M & M Co	Cal	Wm Willis	309 Montgomery st	50	Jan 15
Silver King M Co	Arizona	J Nash	318 Pine st	50	Feb 15
Standard Con M Co (2)	California	Wm Willis	309 Montgomery st	75	Feb 12
Western M Co	California	C S Curtis	309 Montgomery st	75	Jan 10

## The Mining Share Market.

They are beginning to think now there will be no "stock market" until spring, and as a Pioche paper said lately with regard to a promised spring rally, "it is the same thing every year now." Even those who have money that they want to put into stocks are not now investing. They see no reason for taking bold of any particular stock at present, and should they buy on general principles are liable to get their money in at the wrong point; also, may catch an assessment or two before anything "comes to a head." This being the case most dealers are awaiting the time when the operations at present in progress in the leading mines shall show developments giving promise of workable ore bodies.

The Virginia Enterprise thinks that in the meantime there are liable to little spurts at various points. The large joint Mexican and Ophir east winze has now but about 50 ft. to go to reach the 2700 level, and from that point the drill may show something to put a little life into stocks at the north end. Also, something favorable may unexpectedly be encountered at some point on the lode to put life into the market, but it will be two or three months yet before we can look for anything from the main and heavy work in progress at the north end, middle mines and Yellow Jacket and Belcher series.

At the Union Consolidated mine No. 7 drill hole from the bottom of No. 1 winze has been discontinued and No. 8 started. Little is expected of this, as the ground in which it is being run is washing worse than was the case in any of the other holes.

As soon as a proper sump has been made at the bottom of the Union shaft the station at the 2600 level will be opened and a drift started for the bottom of No. 1 winze. Explorations by means of crosscuts from the bottom of No. 1 winze will make us acquainted with the true character of the ground penetrated by the drill and of which we now know next to nothing.



The Union Con., situated on the northwest slope of Bodie bluff, has struck, at a depth of 150 ft., a vein 10 ft. in width giving assays averaging \$100.46. The other drifts were made in the south drift, 512 level, of the Noydau. This drift followed the ore vein (usually about 30 inches wide and of fair milling grade ore) 330 ft., where it came into an ore running away \$100 to the ton. In going 8 ft. farther this vein widened to 6 ft. of clean ore, all of it being of very high grade. The prospective value of this strike is greatly heightened by the fact that immediately above this body, on the 412 level, the ore vein was 35 ft. wide, though not of as high grade as on the 512 level. The Bodie shows a still further improvement in the quality of the ore. This is due to the fact that the bulk of the ore extracted during the week was taken from and below the 6th (inclined) level, which proves conclusively that the Fortuna or east vein is growing richer as it descends. The Standard has not reached its ore bodies on the 1,000 level, progress with the crosscuts being slow on account of lack of hoisting power. Goodshaw is storing ore and shipping to the Miners' mill, which was started up Saturday evening. The Silver Hill mill also started up on Saturday evening last, on custom ore. The Spaulding mill will start, on Spaulding ore, about the end of the present week. The Syndicate is turning out a steady stream of bullion. On Sunday some very rich gold and silver ore was struck in the Jupiter mine—the gold passing through and projecting out of the rock in sheets. Boston Con., is stripping from the 250 level in from 3 to 4 ft. of good ore, while the vein followed 305 ft. on the 800 level proves to be from 3 to 4 ft. wide of good milling ore.

## NEVADA.

**LONE RIDGE MIN.**—*Transcript*, Jan. 20: About one-third of the pipe iron shipped via this city for the Lone Ridge hydraulic claim yet remains at the depot here. The delivery of the iron is being made by the Lone Ridge company already delivered is being put together at Oak Tree ranch, and, with the 3,500 ft. of the same size pipe—15-inch—already owned by the company, will be used to convey water from the Milton ditch to the claim, a distance of about 11,000 ft.

## PLUMAS.

**SAVYKOOT.**—*Greenville Bulletin*, Jan. 27: The new 40' stamp mill is running.

**GOLD STRIP.**—Steadily and surely the regular routine of work progresses at this mine and its mills, giving every indication of an unflinching supply of pay ore.

**SOUTHERN EUREKA CON.**—By the last of this week the new 10-stamp mill of this company will be all completed and ready for operations. It is constructed, and the machinery is a credit to the Greenville Iron Works.

**CHICKADEE.**—The weather has been more favorable for operations at this mine; the roads have been constantly improving, and the hauling of ore has been again resumed. The mill will be started in a day or two, we hope for a steady run. Additional silver plates have been provided for the sluices, and increased returns may be expected in consequence. As the weather is looking better, the mill is working well. The Orefield shaft is being put down rapidly. The new pump would handle 5 or 6 times the quantity of water thus far encountered, with the greatest ease.

**GREEN MOUNTAIN.**—Both mills have run without interruption during the past week, and with good results. No. 5 tunnel is showing a fine copper-stained ore in the main pay chute. A large body of water was encountered here, and was making it necessary to suspend operations temporarily, but work has been resumed, the excessive quantity of water having come from the old shaft and works above, and abating when those works were drained. The known extent of this main body of pay, taken in connection with the improved quality of the rock at the increased depth, gives assurance of a most prosperous career for the Green Mountain during many years to come. This shaft is fortunate in containing such a property.

## SHASTA.

**COPPER CITY.**—*Redding Independent*, Jan. 20: The extra mill at Copper City commenced running last Friday. It is thought that the present storm will compel them to again shut down on account of not being able to secure enough wood.

**F. S. Monaro**, Secretary of the Northern Light, was up not so long ago, but was unable to examine the mine, owing to too much water.

## SIERRA.

**BLACK JACK.**—*Mountain Messenger*, Jan. 20: Supt. J. W. Young, of the Black Jack quartz mine, 5 miles east of Downsville, near the head of Jim Crow, and R. Oliver, Esq., of Forest City, visited the Sierra Buttes quartz mine last Tuesday, and inspected the mill and underground workings, all of which were found in good shape. They report the tunnel at the Black Jack in 200 ft. through talcose slate, and as it advances the rock is easier to blast. The shaft are steadily making 25 ft. in 24 hours. The ledge is expected to be tapped 540 ft. from mouth of tunnel. Seven men are employed. Five ft. of snow at that point before the storm, at an altitude of near 6,500 ft. They are well provisioned for the winter, and all other supplies are on hand to prosecute operations until the opening of the roads in the spring.

**HARD ROCK.**—It is reported that hard rock has been encountered in the Ruby tunnel. This will not make much difference with the progress of the work, as the steam drill works about as well in hard as in soft rock, and the bulk of the labor is required to get the drift away.

**B. M. Ex.**—The Bald Mountain Extension Co. are still in gravel with their tunnel with no signs of bedrock. How far they are above bedrock has not yet been determined. The top gravel prospects very well in fine gold.

## TUOLUMNE.

**ROUGH & READY.**—*Tuolumne Independent*, Jan. 20: The Rough & Ready gravel mine in Table mountain, at Peoria flat, is doing well. Mr. Brisky, who discovered the "break out" from the rim rock by a number of cuts, followed into the mountain on the pay gravel with a large force of prospecting tunnels and finds a pay channel of immense proportion in width, also in depth, for the character of the rock is the same as the channel, and this point seems to have backed up so as to expose a face of the vein 50 ft. high. It is the intention of the gentleman from San Francisco, who bought the property, to put on hydraulic works, wash the outside area as far as the basalt will permit and drift up and down the old channel under the lava with a large force of miners. The purchaser, after a short run for prospecting, is said to have washed up enough to have paid for the first cost of the property. The Dutch G. M. Co., on the mother vein proper (adjacent to the Heiler at quartz mountain) have struck a splendid body of ore. Where they worked in the crosscut the vein was 5 ft. wide, and in drifting 45 ft. the vein widened out about 10 ft.; splendid clay and footwall. Vein at this point is all free gold, and will probably go from \$20 to \$30 per ton. A company has started a shaft on the "Dunella" mine, at Amador. A son of Ben Butler is opening up a gravel mine on the Stanislaus, below Peoriaflat.

## YUBA.

**PROSPECTS.**—*Marysville Appeal*, Jan. 20: Judging from observations made during a somewhat extended tour through the foothill regions, the mining prospects of Yuba county have not been so promising for years as at the present time. At Brown's Valley the 10-stamp quartz mill, erected last season, is running day and night, and the returns have been so satisfactory that several new lodes are now being developed, and new mills are in contemplation. Immense quantities of gold were taken out there in early days, and the people are very sanguine that the flush days of the Yuba are just beginning to dawn again. At the Indian Ranch are 2 quartz mills, recently erected, already under way and the other nearly completed. High assays have been made from the rock of several ledges; capital is flowing in, and the people are confident that this will, at no distant day, be one of the busiest camps in the Sierras. At Smartsville, which, by the way, is one of the prettiest little towns in the State, the usual number of men are employed in hydraulic mining, but immense bodies of high grade gravel promising to yield their golden treasure in the future as they have done in the past. Just over the line, in Nevada county, near Spenceville, a 4-ft vein of quartz-

bearing silver is creating no little excitement, 2 assays having been made of the rock, each showing at the rate of more than \$100 to the ton. Near the Calaveras Patch a party of prospectors are now at work on a gold-bearing quartz ledge that they seem confident will pay handsomely.

## NEVADA.

### WASHOE DISTRICT.

**CALIFORNIA.**—*Gold Hill News*, Jan. 30: During the week there have been extracted and sent to the mills 369 tons of ore, the average assay of which was \$21.41. In the office there is a bill for the value of \$29,311.65. On the 2500 level the south drift from the Ophir line has been extended 89 ft.

**CON. VIRGINIA.**—During the week 450 tons of ore have been extracted and sent to the mills; assay value, \$19.78. Bullion in office, \$10,048. On the 2300 level the south lateral drift has been extended 23 ft.

**OSUR.**—On the 2500 level the joint Mexican east winze has been sunk and timbered 12 ft., and a tank pit is being cut out at the 2000 level. On the 2500 level the joint Mexican west crosscut has been extended 14 ft.

**SILVER HILL.**—On the 2300 level the upraise has been advanced 20 ft.; total, 500 ft. The north drift, 2500 level, has been advanced 10 ft.; total length, 410 ft. During the past week but 39 6-10 tons of ore were raised.

**MEXICAN.**—On the 2500 level the joint Ophir east winze has been sunk and timbered 12 ft., and are cutting out a pump and tank pit at the 2000 level. The joint Union Con. east crosscut has been extended 32 ft.

**UNION CON.**—On the 2500 level the joint Mexican west crosscut has been extended 20 ft., the joint Mexican east crosscut 32 ft., the joint Sierra Nevada east crosscut 50 ft., and drill hole No. 8, from the bottom of winze No. 1, 175 ft.

**UTAH.**—Since last report the east drift on the 1050 level has been advanced 12 ft. The ground still continues hard. On the 2150 level the east drift has been extended 21 ft.; the ground is soft.

**HALE & NORCROSS.**—The frame of the main hoisting works is up, and the carpenter and blacksmith shops closed.

**UNION SHAFT.**—No sinking was done during the week; repairing drill at 1600 level, cutting out bob-pit at 2200 level, and casting timbers at the 2300 station.

**ALTA.**—During the past week the shaft has been sunk and timbered 35 ft.; total depth below the 1550 level, 125 ft.

**SILVER HILL.**—Last Sunday morning the pinion to the pumping engine gave out, which stopped the pump 62 hours, and the water raised in the incline 120 ft. The water was out Thursday morning, but owing to the great heat nothing could be done in the winze toward slaking.

### BELMONT DISTRICT.

**WILL RESUME OPERATIONS.**—*Belmont Courier*, Jan. 30: John P. Curtis, Superintendent of the San Antonio and Jett mines, informed us on Monday last that now companies are being organized in the East, and that work will be resumed in the San Antonio and Jett mines on the 1st of May. During the past week the shaft has been sunk and timbered 35 ft.; total depth below the 1550 level, 125 ft. and other districts north and south, to develop their properties in good shape. (Quick transportation and a reduction in freights are what the people of this section need.)

**BARCELONA ORE.**—Three tons of Barcelona ore, shipped to Eureka recently, worked \$150 per ton; 4 tons mixed with screenings worked \$117 per ton. There are large quantities of richer ore in sight in this mine. We understand that the owners of this valuable property will put up reduction works at Spanish Bell in the spring.

### CHERRY CREEK DISTRICT.

**GROWING.**—*White Pine News*, Jan. 29: Cherry Creek is receiving fresh additions to its population by every day. We make the prediction that another year will find us one of the most prosperous mining camps in the State.

The Star company paid off last Saturday. The monthly pay-roll of the company reaches \$14,000, and the total cost of operating the mill and mine is \$30,000.

The price of real estate is visibly raising in Cherry Creek. Lots that a few months ago could be purchased for \$20, are now commanding up in the hundreds. Rents also have an upward tendency. All of which is an indication of the good times ahead.

SEVERAL loads of the new machinery for the Ticup mill arrived this week from the railroad, and will at once be placed in position. The mill building is fast approaching completion.

**BULLION SHIPMENTS.**—The Star company made the following bullion shipments, through Wells, Fargo & Co., during the past week: Jan. 25th, 5 bars, valued at \$2,300; Jan. 27th, 2 bars, valued at \$1,600; total, \$3,900. The Exchange company shipped 1 bar, valued at \$1,400, on the 25th.

### EUREKA DISTRICT.

**EUREKA TUNNEL.**—*Eureka Sentinel*, Jan. 20: Owing to the impure air in the header of the Eureka tunnel, they can work but 1 shift in 24 hours at the present time, but a change for the better in this respect is evident within the past few days. This is accounted for by the change of formation. The tunnel is now in 1,610 ft., and the head of the tunnel is upward of 1,000 ft. below the surface. The ore indications are more favorable at the present scene of labor than they have been for the past 800 ft. They are out of the shale entirely, and are working in a mixture of clay and spar.

**THE GRANT MINE.**—There are hundreds of good mines on Prospect mountain and the surrounding hills, which, if worked by experienced miners, could be made to pay more than \$4 per day. Many of them could be leased on favorable terms. We have 1 in mind now. It is the Grant mine, on McCoy hill. Some time ago Messrs. Jerry McCallum, Sam Bell, A. L. Conery and John Cuff secured lease of the mine. They worked it to good profit, but as the warm days of the past few weeks have revived the desire to travel, and as Bob Waters and brother had a liking for the looks of the mine, they sold out their lease to the Waters Bros. The mine remains in the hands of the lessees for 10 months longer. The Grant ore has always been of high grade, and we understand that its yield promises well from the present outlook.

### GRANTSVILLE DISTRICT.

**THE BROOKLYN.**—*Cor. Grantsville Bonanza*, Jan. 29: In the Brooklyn line of development in lower level advances without interruption. By a winze west of incline we have connected with 1st level, thus giving complete ventilation, and now everything is in line order to furnish ore for 20 stamps, or as many as the Alexander company can spare.

**COLIN PARK.**—The San Francisco mine is down 35 ft. from the croppings, with assays from bottoming, \$41.23 silver and \$17.50 gold. In the Arctic we are running a tunnel which will tap the lode in about 100 ft. At 40 ft. from the mouth we passed through a blind lode, 2 ft. wide, of fine decomposed quartz, average assays \$105 gold and a trace of silver. In North Star, average assays, \$10.03 silver and \$105.62 gold.

### GOLD MOUNTAIN DISTRICT.

**PROSPECTS.**—*Esmeralda Herald*, Jan. 20: From a gentleman just from Gold Mountain we learn that the prospects are good for a considerable time. A live camp with the prospect of a big strike. The company owning the mines is making every arrangement for active work, and by April or May will have things running in good shape. The mine contains a large body of gold ore that assays sufficiently large to insure a good profit, and there are prospects of the camp becoming a permanent one. The company is engaged at present in bringing water to work the mines from a distance of over 13 miles, and is laying out 50 men in the town.

### MAITLAND DISTRICT.

**FORMING THE DISTRICT.**—*True Fissure*, Jan. 29: On Wednesday of last week a meeting of the miners and claim owners of Maitland mining district was held. F. Schofield was elected Chairman and J. H. Turner, Secy., John Powell was elected Recorder. Maitland district

comprises the greater part of the old Walker Lake district, and is bounded as follows: On the north by the old canal tract, beginning at Silver Star district and running to the southeast end of Walker Lake; on the west by the line of the Carson & Colorado railroad and the Alum creek wagon road; on the south by the Carson and Columbus toll road, and on the east by the Black Diamond district. The district lies principally on the north side of the range of mountains north and west of what is known as the Marietta range. The minerals in the district are copper, silver and gold, with the former in preponderance. In fact copper mining will be the leading feature, and the near advent of the railroad will make many hitherto valueless veins worth money. Mr. Turner and his partners have made 4 locations called the Lacy Bortram, Peacock, Rainbow and the Johnny-come-lately. Considerable work will be done in this district during the spring and summer, and it bids fair to make a stir in the copper mining interests of the county.

### RED MOUNTAIN DISTRICT.

**VEINS.**—*Cor. True Fissure*, Jan. 27: The Red Mountain mining district, from personal inspection, appears to be a network of ledges, many of which by judicious location can be made valuable. Good opportunities are offered to the prospector and capitalist. The ledges being gold, upon development, will find ready purchasers. A great many claims have been formerly held by location fiends, who go about gobbling up good, bad and indifferent ground. They then sit down with the fond expectation of selling out, without doing a tap of work on their claims, or waiting for other claims to be developed that they might sell out through the energy of, and risking neither capital or labor.

### MOUNT CORY DISTRICT.

**TIK MINES.**—*True Fissure*, Jan. 29: Mount Cory district is situated about 45 miles from here, 6 miles south of Mount Grant, and 6 miles west of the main line of the railroad town on Walker Lake. The district lies between Mount Grant and Mount Cory, and the auriferous ores are found in fissure veins in a micaceous or syenite granite of a soft character. The Golden Eagle claim has 100 tons of ore out, and a little depth indicates that the dip of the vein will change from east to west. All the veins in the district carry fine gold, and the ore is easily reduced. There is one fine improvement, with something like a galbladder, owners of the Big Indian claim, purchased a small grinding pan in Bodie and took it to Mount Cory. The first charge they put in was 500 lbs of ore, which yielded \$60 in gold worth \$17 per ounce. Subsequent charges gave similar returns. What is needed in the district is a 5-stamp mill to do custom work, as most of the claim owners are poor men, but have plenty of rich ore in sight to enable them to prospect their several claims if they could get returns for their ore. At present there are but 3 companies working in the Mount Cory district proper, but several others are operating at Mount Orant, 6 miles north, and about Squaw creek, 6 miles south. The country thereabouts has not been prospected to any extent, and yet it is said to be full of gold-bearing quartz veins.

### PIOCHE DISTRICT.

**TRAO DULL.**—*Pioche Record*, Jan. 29: A number of our miners, carpenters, artisans and even business men are talking of going to Arizona, where work is supposed to be plenty and business fair. There is very little show here for any class at present. Business men are comparatively doing nothing, and the general outlook is gloomy. There is no chance for any man in Pioche, or hardly in Lincoln county, to look forward to pay-days, for very few men are now working in the county who are under a regular salary outside of county officials. There are some few watchmen employed to look out for mines and mills, and some few men at El Dorado Canyon who are employed in the mines and mills there, but, with these exceptions, the balance are living on hope. Everything that is good is expected to turn up in the future, but the camp this spring, and so we have lived for several years past.

### SILVER CANYON DISTRICT.

**PROSPEROUS.**—*White Pine News*, Jan. 23: Ed. Cannon came in from Silver Canyon Thursday evening. He reports the present condition of affairs prosperous. The mill is running nicely and producing good bullion. He says that Dr. Brooks and the people generally over there have unbounded confidence in the future of the camp. Ed. is a whole-souled, genial fellow, and will remain with us a short time.

## ARIZONA.

**GLOBE DISTRICT.**—*Silver Belt*, Jan. 22: Rose, Mason & Jaeger are at work on the Big Injun, Black Hornet and Silver Bow group of mines. They exhibit some very fine ore, assaying from 200 to 400 ounces per ton. This group of mines is located opposite the Cox & Coplin mines in "Tarantula" hill, in which some 10 or 12 veins and strata center. W. W. Palmer, favorably known among mining men of Nevada, was with us last week and had occasion to visit the Stonewall mine, owned by Mr. Joseph Chapman & Co. He pronounced it a good mine, and, after thorough examination of the same, was of opinion that it ranked among the foremost mines of our Territory. Mr. Riotte also examined this mine and classes it as the most promising mine in the district. The owners of the Julia mine are sinking a shaft with a view of striking the ledge at a depth of about 75 ft. This lode is the one on which the Centennial mine is, and adjoins it on the north. The Julia's shaft is only 150 ft. from that of the Centennial's.

**TOMBSTONE.**—*Nugget*, Jan. 29: Yesterday the purchase of the Sunset mill, on the San Pedro, was effected, the property passing into the hands of the Head Center Con. M. Co., of which Thomas E. Farish is superintendent in this city. By this transaction the production of bullion in this camp will be largely increased at once. The bullion production in our camp will be increased at least \$100,000 per month, for the Head Center is one of the most valuable properties in the district. Messrs. Carpenter & Vimont yesterday refused \$25,000 cash for the Peacock group of mines, acting under instructions from the owners, who have placed said group, consisting of 6 mines, in the Dragoon mountains, in their hands for sale at a stated figure. Gentlemen put up more cash or some other parties will take the cash.

**PROSPECTS.**—*Cor. Tucson*, Jan. 30: There is no time in the history of this camp that the mines have looked better or the town more prosperous. At present the town is filled with the best of mining men that can be found on the coast. The Three Brothers mine is now down about 95 ft., and they are taking out \$1,000 rock. The Bob Ingersoll is showing up most satisfactorily at a depth of 50 ft. In about a week we will have the whistle of the Empire again. The Emerald is now down about 125 ft. and the ore is wonderfully rich and in a large body. There is another rich strike reported on the Junata. The Randolph Co. have entered into a contract with the Boston mill to work 300 tons of ore. In the Bradshaw they are taking out excellent ore at the depth of 260 ft. They are taking out excellent ore at the partnership shaft of the Tough Nut and Mountain Maid. The Horns mine will begin in a day or two, and the ore from the Three Brothers mine. The old Sunset mill will begin crushing Head Center ore in a few days.

**PIONEER DISTRICT MINES.**—*Pinal Drill*, Jan. 29: A big strike is reported in the Emma mine, in Arnet's canyon. The work on the Gem is going on and the mill will soon be running. Work on the Two Brothers is progressing. Supt. Nettle reports that they are taking out good metal in the shaft. The Surprise tunnel is now 906 ft. long. They are sinking a winze on the vein in gold ore, where the vein is over 30 ft. wide and are getting ready for a big mill. The Lewis is piling big black stuff on an enormous dump.

**SADDLE MOUNTAINS.**—John Wroughton is in town and brings good news from the Saddle. He says the Wheeler is down 70 ft. and they are taking out splendid ore, improving as they gain depth. They are lowering the work on the Golden Eagle. Down 100 ft. and splendid rock. Work has commenced on the Cliff mine, belonging to Wroughton & Co. He is enthusiastic over the prospect. The hills are full of prospectors and new discoveries are made every day.

**SANTA CATARINAS.**—The Acorn mine, adjoining the Cottonwood, has sent us some fine specimens. The Acorn is owned by F. O. Wilkinson & Co.; the assay value of the ore sent is \$317 and \$562. They have found a gold ledge 4 ft. wide close to the Acorn, owned by Chas. Weiser and Wilkinson. The Muro mine has furnished us samples \$18 and \$20 in gold, and \$10 to \$12 silver. This mine is in Catalina. There is plenty of fine timber and water on this mountain. There is sometimes a confusion in the names of Santa Catalina and Santa Catarina. We understand that the same name mountain. Catalina is in Pinal, Catalina is in Pima.

## COLORADO.

**BALAZAR ITEMS.**—*News and Courier*, Jan. 22: Bilar has been looming up of late, and is fast assuming its time appearance. The recent cold weather has interfered materially with the successful running of the mill, although they have been able to accomplish considerable thus far. It is reported that the St. Julian has been sold for a very good price. The Good Hope is being worked by Messrs. Schreiber, Sherman and Waterman, and they are taking out some very good ore.

**SUNSHINE.**—Business in our town just now is scarcely active. No rush or prospecting by outside parties. The Ozark tunnel company keep steadily at work in their crosscut, having passed through 2 valuable veins, still continuing on to reach the 4 others of their group yet remaining. The tunnel is now in 420 ft. The Golden Age Con. mining company, on this range on the north side of the county road, have their tunnel in 70 ft., running on the Comstock lode, and expect soon to recommence work. These are our western frontier mines, well up on the slopes of Big Horn mountain, our silver-bearing belt. The eastern line of our Sunshine mines may be represented by the Emancipation, Western Slope and Dana, the slide line distance about a mile and a half. These mines are steadily worked, the Emancipation by the Emancipation, Jackson, Turner Bros., the Western Slope under lease by Stewart Lewis, Bay & Pervis, and the Dana, also under lease, by Mr. Kelley. Numerous prospects also developed claims be between on this south line, but very few being worked just at this time. Among these, just west of the Grand View, is the Boulder Valley, owned by Cook, Thomas, Coffee & Rosegarner. This claim pays expenses of development, and is being improved, with something like a private pocket distribution. The Washburn, in the center of the camp, owned by Smith & Sons, is working under lease and getting out some fine ore in paying quantity.

## IDAHO.

**YANKEE FORK.**—*Evening*, Jan. 20: The machinery for the roasters at the Custer mill will soon be here, when crushing will be commenced, and a large force of men put to work in the mines. Ore of great richness is now being taken out of the Montana mine. It is filled with gold and silver. The lower tunnel of the Charles Dickens is in nearly 600 ft. and running in a good breast of excellent ore.

**WOOD RIVER.**—*Cor. Salt Lake Tribune*, Jan. 20: Walker & Hart, merchants of this place, have a claim about 1 mile east of town, which they leased to parties a few days since, and when they had blown the cap off at a depth of about 2 ft., they came upon a 5-ft. ledge, much of which assays from \$300 to \$700 to the ton. This gave a new impetus to prospecting in this region, and several fine prospects are being developed. It has been thought that all our best mines in this neighborhood were on the west side of Wood river, but these new developments show that there are good mines running through the hills for a distance of 6 or 8 miles above and below town on the east side of the river. This will undoubtedly give Bellevue a permanence and an importance as a mining center that her most sanguine friends did not expect.

**SNAW MOUNTAIN NEWS.**—*Cor. Idaho World*, Jan. 29: The prospects of this camp commence to look flattering again. The Rising Sun looks better to-day than it ever looked, and there are about 100 tons of first-class rock on the dump. The men at work in the mine are taking out, on an average, 1 ton per day to the man. The ledge in the tunnel is about 2 ft. wide and looking well. In the shaft that the men are now sinking there is a 2-ft. ledge that prospects well. The tunnel has run in on the ore body now between 80 and 90 ft. Another tunnel has been started to tap the ledge 100 ft. deeper. The Paymaster also has started again. Mr. Plowman has begun work on the North Star, and intends to take out a run of rock by spring time.

## NEW MEXICO.

**VERA CRUZ.**—*Las Cruces Thirty-Four*, Jan. 20: The "V" mine, at White Oaks, is said to be a very valuable property, having an average run of ore, in gold, of \$17.65 to \$19.55 per ton, and can be mined and milled on a 100-stamp mill at a cost not exceeding \$1.50 per ton. The owner, F. A. Blake, is negotiating a third interest to Cleveland capitalists. If the trade is consummated a \$100,000 stamp mill will be placed in Nogal canyon early in the summer.

The Mal Pais mining district, in Lincoln county, is developing into remarkable richness. The carbonate beds appear to be of almost limitless extent and depth. Shafts have been sunk to various depths, from 80 to 200 ft., and all show up well. The dirt all pays, but there are 3 principal pay streaks. Assays generally run from \$10 to \$150, though some tests have gone up to the thousands.

A rich strike is reported at White Oaks by parties who were digging a well. Assays return \$800 in gold and \$2.50 in silver from the dirt taken from the well.

MINERS from the Mogollons bring in the most encouraging reports. Work on most of the mines is being rapidly pushed forward and new discoveries are every day made.

An old tunnel on the Rebel Chief, in Colfax county, has been cleaned out and exposed to view a pay streak 6 to 10 inches wide showing free gold along its entire length. It is said that 6,000 tons of ore are in sight in this mine, and machinery is shortly to be erected for working it.

## OREGON.

**QUARTZ LEADS.**—*Pineville Pioneer*, Jan. 20: Ochoo quartz is beginning to attract attention, and within a few days the men in the vicinity of where operations are now being prosecuted, will become as lively a mining camp as can be found anywhere. Some beautiful gold and silver-bearing rock has been brought in during the week from the Last Chance shaft and Ochoo O. & S. M. Co.'s tunnel, some of which has been taken to Portland for assay. The Last Chance shaft has been sunk to the depth of 40 ft., and the active operations will be resumed in the spring. The shaft has been sunk on the ledge the entire depth, varying from 2 to 6 ft. in width, and rich in gold and silver throughout. Mr. Thompson, who has the contract for running the tunnel, informs us that he is now in a distance of 200 ft., leaving 70 ft. yet to be worked, at which point it is expected the main ledge will be struck. These leads are new specimens of many others we have in Wasco county, once taken up by men too poor to develop. Of course we need capital, and eventually it will find its way to the Ochoo mountains.

## UTAH.

**A PROSPECTING COMPANY.**—*Southern Utah Times*, Jan. 29: The organization of a prospecting company of practical miners and capitalists is now being agitated. It will be the purpose of this company to sink shafts in various places in and around Frisco for the determining the exact character of the ground upon which Frisco is built. The same conditions and surface showings existing in and around Leadville, Col., surround this camp, and there is every indication of the existence of vast carbonate deposits under us.

**HORN SILVER SHIPMENTS.**—In a recent issue we stated that the product from this mine in 1880 footed up \$559,185.40. It should have read the number of ounces, which, at \$1.10 per ounce, together with \$210,000 worth of unrefined lead, makes the correct amount. Wells, Fargo & Co.'s report includes \$11,000 worth of gold which is not part of the Horn Silver mine product. The shipments during the past week foot up eight car-loads.



## Physical Studies of Lake Tahoe.—No. 6.

[Written for the Press by PROF. JOHN LE CONTE.]

## Cause of the Blue Color of Certain Waters.

The preceding considerations very clearly indicate that the real cause of the blue tints of the waters of certain lakes and seas, is to be traced to the presence of finely-divided matter in a state of suspension in the liquid. We have seen that Sir I. Newton, and most of his successors as late as 1869, ascribed the blue color of certain deep waters to an inherent selective reflecting property of its molecules, by which they reflected the blue rays of light more copiously than the other rays of the solar spectrum. Since the researches of Soret, Tyndall and others, this selective reflection has been transferred to the finely-divided particles which are known to be held in suspension in greater or less abundances, not only in all natural waters, but even in the most carefully distilled water. When the depth of water is sufficiently great to preclude any solar rays reaching the bottom, then the various shades of blue which are perceived under similar conditions of sunshine, will depend upon the attenuation and abundance of materials held in suspension; the purity and delicacy of the tint increasing with the smallness and the degree of diffusion of the suspended particles. Moreover, it is evident that Tyndall is quite correct in assigning to "true molecular absorption" some agency in augmenting "the intense and exceptional blueness" of certain waters; for it is obvious that the "blue of scattering by small particles" must be purified by the abstraction of the less refrangible rays, which always accompany the blue during the transmission of the scattered light to the observer. It seems to be very certain that were water perfectly free from suspended matter and coloring substances in solution, and of uniform density, it would scatter no light at all. "But," as Tyndall remarks, "an amount of impurity so infinitesimal as to be scarcely expressible in numbers, and the individual particles of which are so small as wholly to elude the microscope," may be revealed in an obvious and striking manner when examined by a powerfully concentrated beam of light in a darkened chamber. If the waters of the lakes and seas were chemically pure and optically homogeneous, absolute extinction of the traversing solar rays would be the consequence if they were deep enough. So that to an observer floating on the surface, such waters would appear as "black as ink," and apart from a slight glimmer of ordinary light reflected from the surface, no light, and hence no color would reach the eye from the body of the liquid. According to Tyndall, "in very clear and very deep sea water, this condition is approximately fulfilled, and hence the extraordinary darkness of such water." In some places, when looked down upon, the water "was of almost inky blackness—black qualified by a trace of indigo." But even this trace of indigo he ascribes to the small amount of suspended matter, which is never absent even in the purest natural water, throwing back to the eye a modicum of light before the traversing rays attain a depth necessary for absolute extinction. He adds: "An effect precisely similar occurs under the moraines of the Swiss glaciers. The ice is here exceptionally compact, and owing to the absence of the internal scattering common in huddled ice the light plunges into the mass, is extinguished, and the perfectly clear ice presents an appearance of pitchy blackness" ("Hours of Exercise in the Alps"; "Voyage to Algeria to Observe the Eclipse," Am. Ed., N. Y., 1871, pp. 463-470). In like manner the waters of certain Welch tarns, which are reputed to be hot-tempered, are said to present an inky hue. And it is more than probable that the waters of the Silver spring, whose exceptional transparency has been previously indicated, would, if they were sufficiently deep, present a similar blackness, or absence of all color by diffusive reflection.

## Cause of the Green Color of Certain Waters.

It remains for us to explain the cause of the green tints which the waters of certain lakes and seas assume under peculiar circumstances. These green colors manifest themselves under the following conditions, viz: (a.) In the finest blue water, when the depth is so small as to allow the transmitted light to be reflected from a bottom which is more or less white. Thus, a white sandy bottom or white rocks beneath the surface of the Lake of Geneva, or the Bay of Naples, or of Lake Tahoe, will, if the depth is not too great or too small, impart a beautiful emerald green to the waters above them. (b.) In the finest blue water, when a white object is looked at through the intervening stratum of water. In the blue waters of the sea this is frequently seen in looking at the white helms of the porpoises, as they gamboled about a ship or steamer. In a rough sea, the light which has traversed the crest of a wave and is reflected back to the eye of the observer from the white foam on the remote side, sometimes crowns it with a beautiful green cap. In March, 1869, I observed this phenomenon in the magnificent ultramarine waters of the Caribbean sea. A stout white dinner plate, secured to a sounding line, presents various tints of green as it is let down into the blue water. Such experiments were made by Comte Xavier de Maistre, in the Bay of Naples, in 1832; by Prof. Tyndall, in the Atlantic ocean, in December, 1870, and by the writer in Lake Tahoe, in August and September, 1873. (c.) In waters of all degrees of depth when a greater

amount of solid matter is held in suspension than is required to produce the blue color of the purer deep waters of lakes and seas. Thus, Tyndall, in his "Voyage to Algeria to observe the Eclipse," in December, 1870, collected 19 bottles of water from various places in the Atlantic ocean between Gibraltar and Spithead. These specimens were taken from the sea at positions where its waters presented tints varying from deep indigo blue, through bright green to yellow green. After his return to England, he directed the concentrated beam from an electric lamp through the several specimens of water and found that the blue waters indicated the presence of a small amount of suspended matter; the bright green a decidedly greater amount of suspended particles, and the yellow green was exceedingly thick with suspended corpuscles. He remarks: "My home observations, I think, clearly establish the association of the green color of sea water with fine suspended matter, and the association of the ultramarine color, and more especially of the black indigo hue of sea water, with the comparative absence of such matter." ("Hours of Exercise in the Alps"; "Voyage to Algeria to observe the Eclipse," Ed. cit. ante, pp. 464 et 467.)

There is one feature which is common to all of the three above indicated conditions, under which the green color manifests itself in the waters of the lakes and seas, viz: When a white or more or less light-colored reflecting surface is seen through a stratum of intervening water of sufficient purity and thickness. Condition (a.) is obviously included; for it is evident that a background of suspended particles may, under proper conditions, form such a reflecting surface.

Inasmuch as under these several conditions, more or less of the transmitted light is reflected back to the eye of the observer, it is evident that the rays which reach him carry with them the chromatic modifications due to the combined influence of the selective absorption of the water itself, and the selective reflection from the smaller suspended particles. Hence, the chromatic phenomena presented, being produced by the mingling of these rays in various proportions, must manifest complex combinations of tints, under varying circumstances relating to color of bottom, depth of water, and this amount and character of the suspended matter present. In the explanations of the green color of certain waters by the older physicists, we recognize the full appreciation of the influences of selective reflection in the production of the phenomena; but they seem to have overlooked the important effects of the molecular absorption. We have seen that Sir I. Newton regarded the green tints of sea-water as due to the more copious reflection of the violet, blue and green rays, while those constituting the red end of the spectrum are allowed to penetrate to greater depths. ("Optics," loc. cit. ante.) Sir H. Davy ascribes it, in part, to the presence of iodine and bromine in the waters, imparting a yellow tint, which, mingled with the blue color from pure water, produced the sea-green. ("Salmonia, Collected Works," Vol. 9, p. 201.) In like manner, Count Xavier de Maistre, ascribed the green tints to the yellow light, which, penetrating the water and reaching the white bottom or other light-colored submerged objects, and being reflected and mixed with the blue which reaches the eye from all quarters, produces the green. ("Bibl. Univ.," Vol. 51, pp. 259-278, Nov., 1832; also Am. J. Sci., first series, Vol. 26, pp. 65-75, 1834.) On the other hand, after Bunsen, in 1847, had established that chemically pure water extinguished the rays of light constituting the red end of the solar spectrum more copiously than those of the blue extremity, so that the transmitted tints were more or less tinged with blue, some chemists were inclined to attribute the green color of certain waters to the presence of foreign coloring substances. Thus Bunsen himself explained the brown colors of many waters, especially of the north-German inland lakes, as produced by an admixture of humus; but he considered the green tints of the Swiss lakes and silicious springs of Iceland as arising from the color of the yellowish bottom. (Vide, loc. cit. ante, p. 44, et seq.) Similarly we find that Wittstein, in 1860, from chemical considerations, concluded that the green color derives its origin from organic admixtures, because the less organic substance a water contains the less does the color differ from blue; and with increase of organic substances the blue gradually passes into green, and ultimately into brown. This is likewise the view taken in 1862, by Beetz, for he insists that in all waters the observed color of the liquid is that of the transmitted light, and not, in any case, of the reflected light. Moreover, he maintains that Newton, De Maistre, Arago and others, were mistaken in classifying water among those bodies which have a different color by transmitted light to that which they have by reflected light. (Loc. cit. ante.)

We have already shown that if the waters were chemically pure and perfectly free from suspended particles, the red rays of the traversing solar light would be first absorbed and disappear, while the other colored rays pass to greater depths, one after the other being extinguished in their proper order, viz., red,

\* Similarly, Arago has very ingeniously applied the same principles to the explanation of the varying colors of the waters of the ocean under different circumstances, showing that when calm it must be blue by the reflective light, but when ruffled the waves acting the part of prisms, refract to the eye some of the transmitted light from the interior, and it then appears green. ("Comptes Rendus," tome 7, p. 219, July 23d, 1838.)

orange, yellow, green, blue and violet, until at last there is complete extinction of the light in the deeper mass of the liquid. But the presence of suspended particles causes a part of the traversing solar light to be reflected, and, according as this reflected light has come from various depths, so will the color vary. If, for example, the particles are large, or are abundant and freely reflect from a moderate depth, and prevent reflection from a greater depth, the color will be some shade of green.

When the water is shallow and a more or less light-colored bottom, or a submerged object reflects the transmitted light to the observer through the intervening stratum of liquid, it is evident that the chromatic tints presented must be due to the combined influence of the selective absorption of the water itself, and the selective reflection from the smaller suspended particles.

In other terms, under these conditions, the tints are produced by the mingling of the blue rays with the yellow, orange or red; so that the resulting hues must generally be some shade of green. In short, all the facts established by modern investigations seem to converge and point to the admixture of the blue rays reflected from the smaller suspended particles with the yellow, orange and red rays reflected from the grosser matters below, as the true physical cause of the green tints of such waters.

## Harmony of Views.

The establishments of the very important function of solid particles held in suspension in water, in producing chromatic modifications both in the scattered light and in the transmitted light, serves to reconcile and to harmonize the apparent discrepancies and contradictions in the views of physicists who have investigated the color of water.

We have already seen that Sir I. Newton and most of his successors, as late as 1847, regarded water as belonging to the opalescent class of liquids, in which the diffuse reflected light and the transmitted light present more or less complementary tints; the former partaking more of the colors constituting the blue end of the solar spectrum, while the latter presented more of the hues belonging to the red extremity. On the contrary, the more recent and more accurate experiments render it quite certain that in distilled water the rays of the red end of the spectrum are more copiously absorbed than those of the blue extremity; so that the emergent transmitted tint is yellowish green or greenish blue. At first view, these results appear to be discordant and irreconcilable; but, it will be recollected, that while even the most carefully distilled water contains a sufficient amount of suspended matter, to scatter enough light, to render the track of the traversing concentrated solar beam visible, yet, in this case, the selective reflection of the blue rays, due to the suspended particles, is not adequate to neutralize the selective molecular absorption of the rays toward the red end of the spectrum. Nevertheless, as has been previously shown, the addition of very minute quantities of diffused suspended matter confers on distilled water the dichroic properties of an opalescent liquid.

The presence of an exceedingly small amount of suspended solid corpuscles, by selectively reflecting the shorter waves of light, is sufficient to neutralize and overcomes the selectively absorbent action of the molecules of water on the longer waves; and thus, to impart yellow, orange or red tints to the transmitted beam. Moreover, it is very questionable whether any natural waters are sufficiently free from suspended matter to deprive them of these dichroic characteristics.

Under this aspect of the subject, the views of Newton, derived from the observations of Halley, those of Hassenfratz deduced from his own experiments, as well as the explanations of the green tints of certain waters given by De Maistre, Arago and others, completely harmonize with the conclusions deducible from modern researches, provided the property of selective reflection is transferred from the aqueous molecules to the finely-divided particles held in suspension.

As a striking illustration of the slight causes which sometimes transform the purest water into an opalescent or dichromatic liquid, it may be interesting to detail one of my own experiences. On the 21st of Dec., 1878, the series of glass tubes employed in my experiments (as previously indicated), being filled with distilled water, the transmitted solar beam presented when received upon a white screen in a darkened room, the usual yellowish-green tint of my winter observations. On the 24th of Dec., or after an interval of three days, during which all parts of the apparatus had remained *in situ*, I was much surprised to find that the transmitted solar beam was enfeebled, and presented an orange red color with no tinge of green. Puzzled to discover what could have produced so marked a change in the optical properties of the liquid, the "scientific use of the imagination" pictured the possible development of ultra-microscopic germ, infusoria, bacteria, *confervae*, etc. The next day (Dec. 25th) the same phenomenon presented itself, when I called the attention of my assistant, Mr. August Harding, who had kindly prepared the arrangements of the tubes, to the anomalous change that had taken place in the color of the transmitted beam. He suggested that, as he had used alcohol in cleaning the glass plates, closing the ends of the tubes, and as the plates were secured to corks by means of Canada balsam, the alcohol absorbed by the corks, being gradually diffused, dissolved some of the bal-

sam, which solution, mingling with the water, might produce a fine resinous precipitate, which might stifle the transmitted beam and scatter the rays of shorter wave length, thus leaving the orange-red rays predominant in the emergent light. This view was speedily verified by a critical examination of the track of the traversing beam. A sensible turbidity was visible, in the darkened room, at the extremities of the column of water adjacent to the corks securing the glass plates; and the light diffused laterally at these portions, when examined by Nicol's prism, was found to be distinctly polarized. The emergent beam, examined by the spectro-scope, exhibited orange and red in full intensity; but the yellow and green were greatly diminished. Ten days later (Jan. 2, 1879) the solar beam traversing the same column of water emerged much brighter than on Christmas day, and the tint was orange tinged with yellow and red. This long repose caused, doubtless, some of the resinous precipitate to become more generally diffused, or to subside, and thus diminished the turbidity of the liquid. The recognition of the dichroism imparted water by the presence of finely-divided particles in suspension, serves, likewise, to harmonize the conflicting views promulgated by physicists who have studied the chromatic phenomena presented by this liquid. Some claim that the rays of higher refrangibility are more copiously withdrawn by absorption; while others maintain that the rays of longer wave lengths are more absorbed. In many cases the chromatic tints ascribed to selective molecular absorption are unquestionably due to selective diffuse reflection from the ultra-microscopic corpuscles which are held in suspension (Vide Jamin's "Cours de Physique," 3d ed., tome 3, p. 447, et seq.).

**RESOURCES OF THE STATE.**—An act to provide for the practical exposition of the resources of the State of California is the title of a bill introduced by Wasson, the member from Mono, and which was referred to the Committee on Agriculture. The Governor, assisted by the State Mineralogist, State Engineer and the Professors of Agriculture and Geology at the University, is to be the director of the work contemplated by the act. These officers and employees of the State, and other specialists who may be chosen by the Governor, are to produce works of a practical and popular nature descriptives of the agricultural, mineral and other resources of the State, treating such subjects as soil and climate, productiveness of the soil, forests, water supply, irrigation, mineralogy and kindred topics, the whole to be illustrated by proper maps and charts. The first treatises are to be prepared from the data and figures already available, and are to be arranged in volumes for publication and sale. Afterward, beside these special works, an annual report of the resources of California, in pamphlet editions, is to be prepared and distributed throughout the United States and foreign countries as the Governor may direct. A general map of the State, together with atlas-sheet detail maps, shall be compiled and published also, which are to be illustrative of the topography, the agricultural and mineral resources of the State. The detail maps shall be sufficiently large to admit of their adoption as county maps, and they shall be furnished to the county officers of the State. The sum of \$20,000 is appropriated for the expenses of the work during 1881 and 1882. The employees of the State or of its institutions shall receive no compensation for their share of this work, except for traveling expenses.

**TO KEEP LAMP CHIMNEYS FROM CRACKING.**—The following recipe for keeping lamp chimneys from cracking is taken from the *Diamond*, a Liepzig journal devoted to the glass interest: Place your tumblers, chimneys or vessels, which you desire to keep from cracking in a pot filled with cold water, add a little cooking salt, allow the mixture to boil well over a fire, and then cool slowly. Glass treated in this way is said not to crack even if exposed to very sudden changes of temperature. Chimneys are said to become very durable by this process, which may also be extended to crockery, stoneware, porcelain, etc. The process is simply one of annealing, and the slower the process, especially the cooling portion of it, the more effective will be the work.

**MATERIAL FOR FLOOR CLOTHS, WATERPROOF GARMENTS AND STEAM PACKING.**—A material has been patented in England for a compound which consists of silicate, cotton dress or slag mixed with rubber. For floor cloths three parts of cotton are mixed with one of india rubber in solution, and the substance is rolled out and allowed to dry. For packing rings the proportions are similar, the compound being rolled and formed into a roller, which is then vulcanized, from which the rings are cut. For a waterproof cloth the proportions are about equal, being spread over the linen fabric in the usual way.

The old ore slopes of the California and Con. Virginia are holding out wonderfully well. Several times in the last year it was thought that but little more ore could be obtained, but always—just when a pay streak was thought about to peter out—a widening or strengthening has occurred just in the nick of time.

A CANAL is proposed from Bordeaux to N. Orleans in France, and is very likely to be constructed. It will be about 250 miles long, the locks allowing the passage of vessels over 400 ft. in length.



## THE ENGINEER.

**RAILROADS IN EUROPE AND THE UNITED STATES.**—In a few weeks the Atchison, Topeka and Santa Fe railroad will form a junction with the Southern Pacific railroad, when we shall have two complete railroads from California connecting with the East. From present indications, there will be, within five years, no less than four railroads extending from the Pacific to the Eastern States on United States territory. There are not less than 92,000 miles of railroad in operation in the United States. This is almost as many miles of railroad as are found in all Europe. Fifty millions of people in the United States have accomplished as much in railroad-building as have three hundred millions in Europe. Still we are considerably indebted to the older countries for capital in these enterprises. Perhaps some of them would have better understood their interests if they had kept some of their money at home and build railroads of their own. If, however, their loss is our gain, we need not complain that they have failed to realize as fully as we have the value of railroads to a country.

**GRAND NARROW-GAUGE RAILROAD PROJECT.** Nearly \$1,000,000 has been raised to aid in the construction of the St. Louis and Texas narrow-gauge railroad, a line which is now being built from Texarkana to Waco, Texas, which it is designed to extend from the former point to Cairo, Ill., there to connect with a narrow-gauge road to St. Louis. It is also intended to push the road from Waco to the Rio Grande, to connect with the Palmer-Sullivan system, which is to be constructed to the City of Mexico, under concessions lately obtained by General Palmer, of the Denver and Rio Grande road, from the Mexican government. It is also in contemplation to ultimately build a narrow-gauge road from St. Louis or Cairo to New York, and thus have a continuous narrow-gauge line from the latter place to the City of Mexico. A syndicate has been formed in New York to carry out this grand project, and sufficient money to complete the road is said to have already been raised. The line between Cairo and Texarkana is to be finished in the course of a year, as the work of construction will be pushed from both ends.

**BUSINESS ON THE SUEZ CANAL.**—It is reported that the traffic returns of the Suez Canal Company for October show the receipts to have been \$628,000, against \$439,919 in the same month of 1879. In the first ten months of the year the increase is from \$4,865,039 to \$6,633,660. The tonnage at the end of September amounted to 3,283,851 tons, and as the traffic is most active during the last three months of the year, it is believed that the tonnage by the end of December will easily exceed 4,000,000 tons. M. De Lesseps, in his argument for the canal in 1855, wrote: "It might be argued without exaggeration that almost the whole of the freight to the East will take the route of the canal." The estimates, however, were not based upon that presumption, and De Lesseps presumed that but half the shipping would pass through the isthmus. He therefore estimated the amount of tolls to be earned on 3,000,000 tons.

**HOOSAC TUNNEL LIGHTED BY ELECTRICITY.**—Experiments with electric light in the Hoosac tunnel have proved that a light can be thrown strong enough to do track work within the tunnel, free from smoke, and the men working at from 500 to 1,000 ft. from the light. With the tunnel choked with locomotive engine smoke the light penetrated the smoke, as nearly as could be judged, 10 times as far as that of the ordinary oil headlight. The tunnel is to be lighted within a few days by 12 electric lights, using a turbine wheel at the east end of the shop for motive power. The wire to be used for connecting the lights with a dynamo machine is a new process or patent, and is, we understand, the invention of Prof. George Mowbray, North Adams, a successful man with nitro-glycerine.

**THE ENGLISH CHANNEL TUNNEL.**—The French Government has extended for three years the concession for the preliminary work on the proposed Channel tunnel to connect England and France. The original concession was made in 1875, for five years. So far all the geological evidence, and especially that derived from the experimental borings, has proved to be highly satisfactory. It is questionable, however, whether in the event of a favorable termination of the preliminary work, it would actually be undertaken exclusively by private enterprise, by reason of its enormous costliness. In such an event, doubtless the two governments interested in its execution will be asked for, and will grant the enterprise, substantial assistance.

The British railways during 1879 carried no less than 502,732,890 passengers. Of these only 38,967,174 were first class, and 63,430,844 second class, while 460,334,872, or more than eight-tenths, were third class. The receipts from the first class were £3,900,000; from the second class, £3,500,000; from the third class, £14,600,000, or about twice as much as both the other classes combined. These figures are striking evidence of the advantageous result of increasing the facilities afforded to third class travelers, and also suggest very strongly that low passenger rates are in the end more profitable to the railways than excessive rates.

## USEFUL INFORMATION.

## Corn as Fuel.

The failure of railroads in being able to furnish coal for fuel in our wide prairies in western and northern Iowa, and more especially Minnesota, the question of fuel for the future is being seriously discussed. It appears to be generally conceded that corn can be raised so cheaply and will make as good fuel as any other substitute. We have tried it. Corn in the ear makes a good and durable fire, and can be burned in either hard or soft coal stoves, and is especially choice fuel for the cooking stove. An acre of corn can be raised for about \$6, including the rent of the land. Fifty bushels of corn will weigh 3,500 lbs., or equal to a ton and three quarters of soft coal. This, at 15 cents per bushel (which is as much as corn is worth on the farm away from railroads this winter), would be as cheap for fuel as soft coal at \$4 per ton. Two bushels of corn will make a fire which will keep a family warm all day, even each winter as we have had since the commencement of holidays. There can be no question of morality in the theory. Corn can be easily and conscientiously planted to raise fire wood, as any tree or plant. Some recommend raising sunflower for firewood, but it is not as good as corn. Nor need this talk about burning corn create any reluctance to removing to regions where they have to burn corn for fuel. It can be raised in one-tenth of the time and at less expense than timber can be raised for the same purpose. And until we have more railroads, or roads of greater capacity, farmers on our wide prairies will have to burn corn. Be it understood, however, it will not take a very great emergency to induce them to do it.—*Iowa State Register.*

**PRESERVING WOOD.**—The improved French method of preserving wood by the application of lime is said to work well. The plan is to pile the planks in a pile in the tank and to put over all a layer of quick-lime, which is gradually slacked with water. Timber for mines requires about a week to be thoroughly impregnated, and other wood more or less time, according to its thickness. The material acquires remarkable consistence and hardness, it is stated, on being subjected to this simple process, and the assertion is made that it will never rot. Beechwood prepared in this way for hammers and other tools for ironwork is found to acquire the hardness of oak, without parting with any of its well known elasticity or toughness, and it also lasts longer.

**MANUFACTURE OF SPOTTED YARNS.**—A recent English invention in which a yarn is made of two or more continuous threads and of a number of short detached pieces of soft slubbing or roving so twisted together that at certain intervals globular or spheroidal knobs are produced, all or some of which contain either a color or a material not contained in the intervening space between the knobs. The rollers and roller driving mechanism is very different from that of the ordinary spinning and doubling frames. The carrier rollers are driven continuously, and the ground and floating rollers intermittently, one at a time, according as the driving wheel is in gear. This driving wheel is covered by a cam plate. The whole arrangement can be attached to any spinning or drawing frame.

**VARIETIES OF A TON.**—A smelter's ton of copper ore is 21 cwt., and weighs 2352 lbs., the manufactured copper being sold at 2,240 lbs. to the ton. Coke for a run-out fire is bought 2,000 lbs. to the ton. A ton of pig iron for a forge is 2,268 lbs.; blooms being sold at 2,464 lbs. to the ton, and 2,700 lbs. constituting a ton of refined metal. Coals on this continent are bought at 2,240 lbs. to the ton, and retailed at 2,000 lbs. to the ton. In England, they are always bought and sold at 2,240 lbs., except at Newcastle, where they are shipped by the chaldron of 30 cwt., of 3,380 lbs., and Newcastle coals are to-day so bought and sold at Quebec, Canada.

**BLEACHING OF STRAW.**—Dissolve 108 grams permanganate of potash (crystals) in 5 liters of hot water. Mix this solution in a tub of water until the water is a deep red. Enter straw which has previously been softening for several hours in a tepid bath of soda and well rinsed. Agitate in the straw frequently. It will turn deep brown; if not, add some permanganate solution; leave it in till discoloration of the bath. When the straw is of a drab shade, rinse in cold water and enter in a bath of sulphurous acid. Make it of a sufficient degree to emanate odor. The discoloration of the straw takes place within 30 minutes, and generally turns a good white.—*Textile Colorist.*

FIFTY years ago when a man could make but 14 coins a minute, people used to take care of them, and when they got bent they straightened them out and made them serve again. Now, 14,000 can be made in a minute, and people are perfectly reckless in their use. Europe makes 80,000,000 daily, and the United States 51,000,000, so the daily loss may be figured at 131,000,000.

**IRON MOUNTAIN, Mo.,** is all that its name implies, being seven-tenths the pure iron. It is nearly a mile long, half a mile broad and several hundred ft. high. It is being carted away at the rate of 850 tons a day.

A SOLDERING fluid which does not occasion rust is prepared in the following manner: Small pieces of zinc are immersed in muriatic acid, and left in it until the acid is saturated with it, which may be known by the cessation of ebullition of the acid, and also by the zinc, added after that stage, being left undissolved; add spirits of ammonia, about one-third of the quantity of the acid; thin with a little quantity of rain water. When, at the time of adding the zinc, the muriatic acid is heated to a low degree, the solving of the zinc will be achieved sooner. This fluid does not cause rust on iron or steel, and is excellent for all purposes, even for tinning.

**CEMENT FOR MARBLE.**—Sift plaster of Paris through muslin, and mix with shellac dissolved in alcohol or naphtha. As soon as mixed apply quickly, and squeeze out as much of the composition as possible, wiping off that which squeezes out before it sets. The cement will hold better if the parts to be joined be roughened by a pointed tool before cementing, which can be done without destroying the edge of the fractured part.—*Monthly Magazine.*

**HARDENING GLUE.**—The only thing that will render glue perfectly insoluble is bichromate of potash. If you add a little of this in solution to the glue and after applying the glue to the article expose it to the sunlight, it will become insoluble, even in hot water. Better expose for a good while, say an hour or so, to make sure that all the glue has become insoluble.

**PLATING SMALL ARTICLES.**—Covering small pieces of steel with brass: Plunge them in a solution of six grams of sulphate of copper and six grams of chloride of tin in a quart of water. To whiten silver articles boil them in a solution of 1 part of cream of tartar, 2 parts of salt, and 50 parts of water, until they assume a fine, unpolished white.

TO REPAIR a watch dial take a little pure spermaceti, melt it with white of silver, and carefully fill the injury of the dial; rub it smooth with a linen rag, and finish with silk paper. Spermaceti is better for the purpose than white wax.

ACCORDING to Mr. Fairthorn, benzine may be freed from all offensive odor by shaking it well up with quicklime, about three ounces to the gallon.

## GOOD HEALTH.

## How the Waste of the Body is Thrown Off.

At a recent meeting of the Griffith Club of Microscopy (Detroit), the fascination of microscopical study was well illustrated by the demonstration of Prof. H. Stowell, of Michigan University. Demonstration number one was upon epithelial cells, which he produced from the inside and roof of his mouth with a "poetical" movement of the tongue, and deposited upon a glass slide, to all appearance, a drop of saliva. Skimming the air bubbles from the top with a pin, and removing the surplus saliva with a piece of blotting paper, he added a drop of staining fluid to better define the cells, and placing it under a microscope exhibited a multitude of thin, transparent scales, each about one five-hundredth of an inch in diameter, and containing a nucleus in the center. This, he asserted, was the form in which a large part of all bodies wasted, being thrown off through perspiration constantly. Demonstration number two was of glandular epithelial cells, from the scrapings of the liver of an ox, much smaller, but similar in some respects to those previously shown. Demonstration number three was of cells from the mucous membrane of the roof of a frog's mouth, which exhibited the extraordinary action of the cilia. These cells were fringed with hair-like protuberances, styled cilia, that moved with great activity and regularly, and seemed endowed with separate organic life and intelligence. The Professor asserted that these cells were very common in the human body, noticeably in the bronchial tubes, where the cilia, moving always in one direction, were active in throwing off foreign substances injurious to health. Demonstration number four was of the circulation of blood in the feet of several frogs, rendered insensible by an injection of woorara.

**PROLONGATION OF LIFE.**—Some years ago the French ministry addressed a circular to all the prefects, desiring them to institute inquiries as to the conditions which appeared peculiarly to favor longevity in their several districts, and the replies are said to have almost unanimously indicated as the leading elements or influences great sobriety, regular labor and usually in the open air, daily exercise short of fatigue, early hours, a comparatively well-to-do life, calmness of mind in meeting troubles, moderate intellectual powers and a family life. The beneficial influence of marriage on the duration of life is universally admitted, and re-marriage does not seem to us unfavorable. The prefects also indicate heredity as a frequent cause, and the influence of climate is also admitted; this latter, however, is separable with difficulty from other causes which may be operating simultaneously; but if all things were otherwise equal, it would seem that southern are less favorable to longevity than northern climates.

## Rheumatism.

Common rheumatism is a disease which affects the joints, the hinges of the body, in such a way, that the slightest motion of the ailing part gives pain. A creaking hinge is dry, and turns bard. A single drop of oil to moisture it makes a wonderful change, and it instantly moves on itself with the utmost facility. All kinds of rheumatism are an inflammation of the surface of the joints. Inflammation is heat; this heat dries their surfaces; hence, the very slightest effort at motion gives piercing pains. In a healthy condition of the parts, nature is constantly throwing out a lubricating oil, which keeps the joints in a perfectly smooth and easy-working condition. Rheumatism is almost always caused—indeed, it may be nearer the truth to say, that it is always the result of a cold dampness. A dry cold, or a warm dampness, does not induce rheumatism. A garment, wetted by perspiration or rain, or water in any other form, about a joint, and allowed to dry while the person is in a state of rest, is the most common way of causing rheumatism. A partial wetting of a garment is more apt to induce an attack than if the clothing were wetted; because, in the latter case, it would be certainly and speedily exchanged for dry garments. There are two very certain methods of preventing rheumatism. The very moment a garment is wetted in whole or in part, change it, or keep in motion sufficient to maintain a very slight perspiration, until the clothing is perfectly dried.

The failure to wear woolen flannel next the skin, is the most frequent cause of rheumatism; for a common muslin or linen or silk shirt of a person in a perspiration, becomes damp and cold the instant a puff of air strikes it, even in mid-summer. This is not the case when woolen flannel is worn next the skin.

The easiest, most certain, and least hurtful way of curing this troublesome affection is, first, to keep the joint affected wound around with several folds of woolen flannel; second, live entirely on the lightest kind of food, such as coarse breads, ripe fruit, berries, boiled turnips, stewed apples, and the like. If such things were eaten to the extent of keeping the system freely open, and exercise was taken, so that a slight moisture should be on the surface of the skin all the time; or if, in bed, the same thing were accomplished by hot teas and plentiful bed-clothing, a grateful relief and an ultimate cure will very certainly result in a reasonably short time. Without this soft and moist and warm condition of the skin, and an open state of the system, the disease will continue to torture for weeks and months and years.

Inflammatory rheumatism may, for all practical purposes, be regarded as an aggravated form of the common kind, extending to all the joints of the body, instead of implicating only one or two. For all kinds, time, flannel, warmth, with a light and cooling diet, are the great remedies.—*Hall's Journal of Health.*

**THE DANGERS OF SEA BATHING.**—The death of Lord Justice Thesiger, writes Olive Logan to the *Philadelphia Times*, was the result of a singular cause. When the deceased legal light was a baby two years old, he had scarlet fever which was followed by inflammation of the left ear. He was deaf in the affected ear more or less all his life, and three or four years ago he consulted Mr. Dalby, the great aurist, one of the few men on earth who really know anything about the diseases of that most complex and delicate organ, the ear. Mr. Dalby found perforation of the tympanic membrane—that most frequent of all causes of deafness—and advised artificial protection. A few weeks ago the deceased gentleman was bathing in a rather rough sea, when he was knocked on the left ear by a heavy wave. Intense pain soon followed, coupled with stiffness of the neck, which indicated that inflammation had extended along the internal passages. The best medical and surgical talent was summoned, but nothing could save him. It should be mentioned that at the time the wave struck the Lord Justice his ear was not protected, and I record this case in the hope of warning readers against the danger of going into the sea without protecting the ears with small wads of cotton. At the French watering places the attendants are always provided with cotton hating, which they offer to bathers. On exceptionally cold days, too, it is well to protect the ears from bitter winds with cotton. Ear-ache and deafness are the frequent results of a lack of care in this matter, but this is the first time I ever heard of death being directly traceable to a perforated tympanum.

**OATMEAL AS FOOD.**—Oatmeal, as is well known, is a food of great strength and nutrition, having claims to be better known and more widely used than it is at present. Of much service as a brain food, it contains phosphorus enough to keep a man doing an ordinary amount of brain work in health and vigor. All medical authorities unite in the opinion that eaten with milk it is a perfect food, having all requisites for the development of the system.

**SWALLOWED A LIVE BEE.**—One day last week Augustus Springham, of Freeburg, Snyder county, Pa., drank a cup of cider, and immediately after drinking he felt a severe pain in his throat, which rapidly increased, and his throat soon became so swollen that he was scarcely able to swallow. He now feels confident that he drank a bee, which stung him.





W. B. EWER..... SENIOR EDITOR.

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#### The Week.

The week has been a stormy one. News of flood comes from all quarters; and as we write (Thursday evening) there is a steady downpour of rain. A good many of the farmers will lose by this storm, and some of the miners, too; the latter being liable to have lots of work on ditches, etc., when this is over. The heavy rains, however, are clearing out the ravines, canyons and gulches, carrying the tailings further down out of the way. The ground will be well soaked, too, which will benefit the hydraulic miners. The abundance of water everywhere has made the miners rejoice, although those with quartz mines unable to take much surface water may grumble a little.

The storm has interrupted travel a good deal, and the gathering of news has not been an easy matter, apparently, for the California interior papers are short of their usual local mining items.

We give elsewhere in this number an abstract of legislative proceedings, and also an account of the results of the storm. Our readers will find a good deal of other matters to interest them in the PRESS. We aim to continually improve and to obtain all the information of value to our special readers that is possible. Our mining field is widening gradually but surely, but we keep track of all improvements in the mining and metallurgical line that is of value.

**COPPER ORES.**—The present quotations for copper ores in this city are as follows: For 20% ore, \$1.60 per unit; for 30% ore, \$1.85; for 40%, \$2.; for 50%, \$2.10; and for 60%, \$2.25. Copper miners understand, of course, that this is for a ton of 2,352 pounds.

**SUTRO Tunnel** company stock is now worth \$1 per share.

#### Surplus Population in Mining Camps.

Every actual producer in the world seems to be compelled to support by his labor two or three non-producers. The only wonder is that they continue to be willing to do so. This is nowhere better illustrated than in mining camps, and especially in new and prosperous ones. As the camp starts in when hard work is the rule and contingencies have to be considered, there are comparatively few non-producers. As it grows, becomes prosperous, mines are opened, reduction works put up, and the town enlarges, there will be then four or five times as many people living in the town as there are miners, who are the real producers. Then a decadence sets in, times come down to a bed-rock basis, the superfluous population begins to drain off gradually, until by and by the few miners only are left. It will generally be found too that the people who have gone have all the money while the miners, who earned—and spent it—are without any. We were reading this other day the statement of a correspondent in Tombstone, Arizona, in which he said there were from 1,000 to 1,200 structures fringing the streets of that camp, and that the inhabitants number at least 3,000. At the same time he said the place only gives employment steadily to some 400 miners. This is only a case in point.

In California, mining districts, with the exception of Bodis, perhaps, this surplus population has been cut off, and has taken to other pursuits. Of Nevada, the same may be said. One will find in this State and Nevada, that working miners, with their families, form the principal population of the mining towns. There is not the idle adult male population, which formerly existed. The fact that mining matters in these two States are on a more substantial and steady basis, may account for this. We have now passed our periods of excitement. We have no "rushes," no sudden opening of new regions to which flock all the idle people of the country. Our camps are like manufacturing towns. Certain mines are worked and certain "hands" are employed. People who work are acceptable, and those who come to live off the workers, or to idle away their time, are not wanted. The time has gone by when the presence of a crowd in a town indicated prosperity. We have learned better now. It is more apt to show signs of a feverish, unhealthy excitement. But as a strictly business proposition a "crowd" is no use.

In traveling through Nevada, as in this State, the older camps show no signs of surplus population. Everywhere are seen working miners who contribute their share to the aggregate bullion product, but without any noise or fuss. We believe one reason why California has kept up her bullion product so as still to be second on the list of bullion producers, and this year show an increase of over half a million, is that so many small groups of miners are at work all over the State. We have had no advent of capital, no advertising of our resources, no special notice taken of our mines, yet we produced last year \$17,000,000 of gold. Surplus population of mining camps is passing south. It is going to Arizona and New Mexico, and those territories will have to get rid of a good deal of it before a solid, regular and business-like development of their resources will be possible. The sooner the non-producers are set at some honest labor the better it will be for the country.

**BAD GROUND.**—The ground in the south header of the Sutro Tunnel swells so badly and so crushes the timbers that it has been found necessary to stop work at the face and put the men to work at easing up the timbers. It will be necessary to overhaul about 150 ft. of the header. Of this 100 ft. is very bad ground, and 50 ft. that would eventually give trouble. It will be necessary to dig out about four ft. over the roof timbers, and from three to four ft. behind those on the sides, and put in false sets of double timbers. Toward the face of the header timbers 14 inches square are bent and splintered until they almost meet in the middle of the drift. The ground is a mixture of clay and boulders of andesite rock.

**WILLIAM C. BENNETT** has filed a complaint in equity against the St. Lawrence Mining Co. and its trustees, praying that the Court enjoin and restrain the company from selling or transferring certain certificates of stock claimed by him. The complaint sets forth that on the 24th of January plaintiff was the owner and holder of 37,121 shares of the capital stock of the company, which were subsequently transferred by L. L. Robinson as President of the company and Clinton Gurnee as Secretary, to several parties without any consideration. Plaintiff, besides claiming the said number of shares of the company's stock, also claims damages in the sum of \$5,000.

The strong suit of any paper published in a country town is in its local department, but a good many of them pay more attention to general politics and general topics than to local affairs. A pattern paper in this respect is the old *Mountain Messenger*, Downieville, Sierra county. We always find it well supplied with local items, and can keep track, through it, of the developments of the mines of the county. We wish some of our other interior exchanges would follow the suit of the *Messenger*.

#### Prospect Holes and Mines.

We have heard lately a good deal of what seems a well-founded complaint about some of the Arizona camps, viz: That mine owners and locators prefer letting the mineral lie upon the dumps for the inspection of strangers and intending purchasers, rather than to let "chloriders" and "tributers" work the claims, or to work them themselves.

This sort of thing may do for a little time, perhaps, but it will not last long. There are not very many men trotting around the country with hags of twenties or rolls of greenbacks looking for little holes in the ground with a swelling around the top. They would much rather, as a general thing, find a deeper hole and less dump, as indicating that the miner was not afraid to go down on his claim, and that the ore he took out paid him to work. Small holes and comparatively big dumps may do well enough for greenies, but few mining men care to invest much coin in that direction.

If the ore is rich and will pay wages to work, why not, when there are facilities, work it up? What is the use of letting a number of tons of good ore lie on the dumps simply to impress strangers; and especially when it *don't* impress strangers who know anything of mining.

Where there are no means of having ore reduced there is of course some excuse; otherwise, there is none. With good ore in a mine, nowadays, "chloriders" can always be found who will take it out on shares. Of course they have to be overlooked so they will not injure the workings. But the claims should be worked in some way, anyhow, and not left idle.

It is the bane of all camps, however, to have a lot of prospect holes owned by a few shiftless sort of men calling themselves miners, but who are only on the sell and not on the work. They work enough to open a hole and show up a lead a little so as to get a few tons of ore on the dumps. Then, imagining this lead to run to China, on the same basis as the first 20 ft., they sit down and wait for some one who is willing to discount the future for them. We have no patience with this class of prospectors. In Arizona, where rich surface ores abound, miners working for themselves ought to do well. But if they are content to sit down beside a few tons of quartz and await for coins double eagles to be poured into their pockets, it is their own fault if they have in the end to pawn their tools for a "grub stake."

#### Tombstone.

All the correspondents who write from Tombstone agree upon one proposition—that business in every department is overdone. The name of the camp is appropriate if indicative of the fate or the hopes of many who pinned their faith on making fortunes there as they were made in California in early days. People are flocking there by tens and hundreds every day, most of them with money enough to bring them, and who once there are left to their own resources. The town is growing rapidly, but is said to be almost one year ahead of the mines. The mines themselves are very easily worked and do not require half the number of men, mines of the same development would in Nevada. As far as the prospects for miners are concerned, we can do no better than quote an extract from a letter of a very plain speaking and sensible correspondent (J. D. P.), of the *Eureka Sentinel*, a man whom we know to be well posted on mining matters. He says:

"In population and business, Tombstone is as top-heavy as Uncle Sam's army, with its numerous Generals. This at first glance is evident to the observant stranger who comes to spy out the country and rate the business prospects and the social aspects of the place. There are probably 1,000 or 1,200 structures of all grades fringing the streets here, while the inhabitants must number at least 3,000 to keep within proper approximate bounds. Now this is a large population for a place not affording steady employment to more than 400 miners. In consequence there are many idle, who, had they remained in their former localities might have employed their physical capital to greater advantage than they have here. Eureka's two great properties employ as many if not more than are employed here altogether, notwithstanding the fact that there are eight or nine hoisting works visible from the streets, and that there are 10 or 12 incorporated properties in process of operation and partial development. From the foregoing data the stalwart sons of toil, for whose benefit I here present them, can each for himself understand how much better it is for him to remain where he is and be contented with his lot, if employed, than to come here in search of what he left behind him and cannot very readily obtain here. For these reasons I would not encourage miners of any grade to come here to look for work by the day exclusively, and the same applies with equal force to other orders of labor, such as clerks, bookkeepers, shopmen, lawyers, doctors and Micawbers generally, for here there are already enough and to spare. But if men have some means and prefer to turn prospectors, and range amid the hills and mountains in search of their hidden treasures, I say to all such that there is room enough for all who come of this class, and they may be expected to find greater and more certain reward for their labor than they could in, perhaps, any other such country on the globe."

#### Water on the Comstock.

The Belcher mine for the past year has had a great deal of trouble with water like many other Comstock mines. At the annual meeting of the company in this city the other day, the Superintendent in speaking of this subject said that the vertical portion of the pump-rod had broken twelve different times up to Sept. 1st, causing a stoppage for repairs of at least 36 hours each time. It was then deemed advisable to remove the old rod and replace it with a new one. This was done, and a new rod 14x16 was put in from the surface down to 70 ft. below the 900 station. This rod is made of the best Oregon pine, strapped with 10-inch plates all the way. The foundation for this V-bob was taken out and rebuilt. The V-bob itself was taken to the surface for repairs, receiving new keys, eyes, brasses, etc., and put down again. All the balance holes were thoroughly overhauled and repaired, making everything connected with the pumps as substantial as wood and iron could do it. Two new donkey pumps were put in at the 3000 station, and for the use of these pumps they laid 312 ft. of 4-inch column pipe from the 2760 level down to the 3000 level. They cut out a water drain and put down boxes on the 2760 level from the north incline through to the Yellow Jacket new shaft, a distance of 1200 feet. The incline track was repaired for a distance of 500 ft., and 513 ft. of water boxes were put in from the 1600 to the 1900 stations. The breaking of a portion of the pumping machinery of the Yellow Jacket new shaft caused the Belcher to fit up two pumps at the 2760 level and put down 342 ft. of 4-inch column pipe for the use of these pumps from the 2560 to the 2760 station, thinking at that time that they could hold the water at the latter level; they had also put in 400 ft. of 2-inch air pipe on this level, to convey compressed air from the Crown Point, when the Belcher failed to furnish a sufficient quantity to run all the pumps.

Notwithstanding all this work, when the accident happened to the Yellow Jacket pumping machinery—which caused that company's pump to shut down—and finding it to be impossible for the pumps to take care of all the water coming into the Belcher from the Yellow Jacket, Imperial, Alpha, etc., together with the strong body of water in the Belcher itself, it was deemed more economical to allow the water to rise in the mine than to continue fruitless attempts to keep it down, until such time as the Yellow Jacket pump would again start up. They therefore removed all donkey-pumps, engines, blowers, air-pipe, etc., from the bottom of the mine all the way up to the 2160 level.

On Saturday night last this pump on the 2160 level gave out, the working parts having been eaten by the acid in the water. Donkey-pumps were rigged and kept at work and the pump reached, but the water rose so rapidly that the workmen were driven out. Then the Jacket was appealed to and started its tanks hailing at the rate of over 1,500 tons of water per day. Then one of the donkeys broke a valve and it had to be drilled out, causing a delay of five hours; this being fixed a second valve broke, causing another equal delay. The main pump was at last reached, but the water had, meantime, reached 15 ft. along the 2160 level.

The talk now is to the effect that Belcher will connect with the Sutro tunnel through the Jacket drift by tubing from the 1400 level. Should that be done, a double line of pumps would be worked from the bottom up to that level and would be able to handle all the water of the lower levels. The cost would be about \$15,000, of which Crown Point would pay, say \$5,000. The Belcher would save the other \$10,000 in two months in wood alone. The *Gold Hill News* says that this arrangement would allow Overman and Caledonia to come in, too, with their connections. Then, running 3,000 ft. east, connection could be made on the 2295 level of the Overman with the Forman shaft when it reached that depth, and water easily raised from that level and sent through the same connection. The present east drift in Overman on the 2275 level is aimed exactly at the perpendicular of the Forman shaft and could be easily driven over. The whole plan or proposition looks feasible and economical, till such time as the south header of the tunnel makes the Forman shaft.

The Boston Stock Exchange, with its limited number of members, is creating an increasing value for its membership privileges. A seat recently sold for \$7,000. In the New York board seats command \$30,000, and it is said will soon go to \$50,000.

The Lake Superior mining region produced about 25,000 tons of ingot copper in 1880. The great districts of the upper Michigan peninsula yielded \$18,000,000 worth of copper and iron ore during the past year.

It is estimated that the total amount of gold yielded by Cassiar district last year is about \$250,000. Upward of 150 miners will winter in the mines principally on McDame creek, which is now almost entirely occupied by Chinamen.

COLONEL L. W. WOOD, at one time quite a prominent man in mining circles here and in Nevada, and after whom the Woodville mine was named, died of smallpox in this city this week.



## Legislative.

The members of the Legislature visited the now famous hrush dam last week, but came back not much wiser than they went as far as can be seen. The dam was way under water, of course, and notwithstanding the heavy storm and resultant floods since, the dam has evidently stood, as no reports to the contrary have appeared.

The debris question is making a great deal of discussion in the Legislature, but up to present writing (Thursday evening) no vote on the repeal of the debris act has been taken. A number of bills have, however, been introduced intended to remedy the evil. In addition to what we have already published, the following have been introduced:

Cunningham has offered one to promote drainage, and protect farming lands against debris, seaweed and other refuse.

Harlan has offered three bills as follows: To prevent the filling up of the streams, rivers and bays of the State with the tailings and debris from hydraulic mines. Also, relative to parties in actions to recover damages from injuries from flows or tailings. Also, in relation to the parties and place of trial in actions for injuries arising from tailings and debris from the mines.

These three bills directed against the running of debris and tailings on the lands of others, provide a criminal and civil remedy against such acts. The civil remedy provides for damages, and allows of an injunction being sued out. The plaintiff may unite as defendants all persons or corporations who have contributed to such injury, and the action shall be tried in the county where the injury is sustained.

Senator Johnson, of Sacramento, introduced the following concurrent resolutions:

WHEREAS, Hydraulic mining has caused the principal waterway of the State to be choked with sand, has made useless much hitherto productive soil, is threatening the total destruction of internal navigation, and is fast rendering unprofitable the cultivation of the best lands in the great valleys, therefore be it

Resolved, By the Senate, the Assembly concurring, that our Senators in Congress be instructed and our Representatives requested to use their best endeavors to have the law providing for the sale of mineral lands so amended that these lands shall not henceforth be sold, but on the condition that they shall never be worked by what is known as the hydraulic process of mining.

Resolved, That his Excellency, the Governor, he, and is hereby requested to transmit a copy of this by telegraph to the California delegation in Congress.

Senator Johnson has introduced another bill relative to drainage and irrigation, which presents in a new form those questions. The bill is preceded by a preamble, as follows:

"WHEREAS, from physical and climatic causes, the material interests of the State are so widely extended and diversified in character that no general law in relation to the ownership, use and distribution of water for irrigable purposes can be made applicable to the whole State. Such a law, calculated to foster and protect the interests of one section might be injurious to another of equal magnitude and importance. Now, therefore, that each and all sections may have the benefit of just and equitable laws applicable to their climatic and physical condition," it is enacted, etc.

Senator Johnson then provides that the State shall be divided into two districts, to be known as the "Drainage District," and the "Irrigable District." The Drainage District shall be composed of the counties of Del Norte, Siskiyou, Modoc, Humboldt, Trinity, Shasta, Lassen, Tehama, Plumas, Butte, Sierra, Mendocino, Colusa, Sutter, Yuba, Nevada, Placer, Lake, Sonoma, Napa, Yolo, El Dorado, Marin, Solano, Sacramento, Amador, Calaveras, Alpine, Contra Costa, San Joaquin, Tuolumne, Mono, Mariposa, Stanislaus, Alameda, Santa Cruz, Santa Clara, San Francisco and San Mateo. It is then provided that the Irrigable District shall be composed of the other counties of the State, which are named. The intent of the law is obvious, as it separates by law two localities which require division in the way proposed.

Among other measures proposed, which are of interest to our special readers, are the following:

Hill's bill so prohibit the purchase or sale of mining stocks on margin provides as follows: "Whoever contracts to have or give to himself or another the option to sell or buy at a future time any grain or other commodity, stock of any mining or other incorporated company, or forestall the market by spreading false rumors to influence the price of such commodities, or corner the market, or attempts to do so, in relation to any such stock or commodities, is guilty of a misdemeanor, and all contracts made in violation of this section shall be null and void."

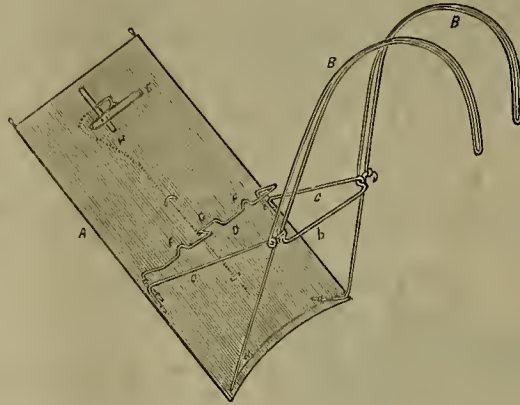
Senate bill, No. 81, by Mr. Brown, relates to laws of mining districts and organization of districts. The bill provides for a new title to Part II. of the Civil Code, with sections numbering from 873 to 895 inclusive. It also provides that the supervisors divide the county into mining districts, and call meetings in the districts to enact mining laws. All citizens who have been 30 days resident in a district prior to a meeting, and who own or work a claim in the district, may vote and take part at the meeting. One of the supervisors must preside, and with two vice-

presidents pass upon the qualifications of any person to vote. The meeting may make a code of laws, but the code for quartz mining must be separate from that of placer mining. Meetings may be called at any time by the board of supervisors to amend the laws.

Assemblyman May's bill amends Section 5 of act of April 16, 1880, by making the money raised by tax on mining and milling of ores by act of April 1, 1878, payable to the State Treasurer (less expenses of collection), who shall keep the money in the Mining Bureau fund, to be drawn upon by warrants for the expenses of the Mining Bureau. The words in brackets indicate the amendment.

The Committee on Mines and Mining Interests reported back S. C. R. 10, relative to the transfer of the mineralogical cabinet to the Mining Bureau, recommending that it do pass. This refers to the collection of minerals at the State Library, Sacramento.

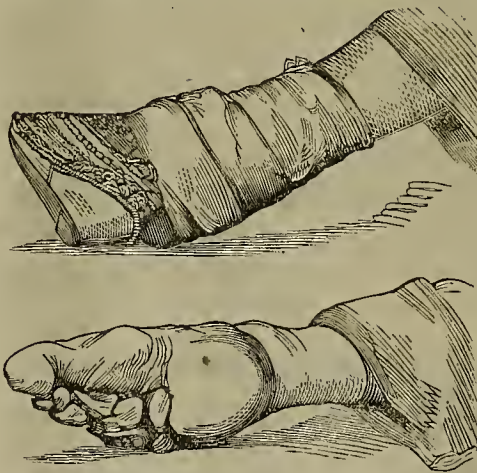
Assembly bill No. 168 is intended to transfer the cabinet of minerals, and all the surveying and other instruments and material belonging to the State Geological Survey now stored at the University of California, to the State Mineralogist. Mr. Hoitt has presented a petition from the Board of Regents of the University, opposing the transfer of the collection on the ground that it is used for instructing the students in the college of mines. The surveying



DAUGHERTY'S IMPROVED BOOK REST.

instruments are used by the class in surveying. The State might easily afford a new set of these to the State Mineralogist instead of having him use the old ones.

Assembly bill No. 195, to amend an act amendatory of an act entitled "An act for the better protection of the stockholders in corpora-



COMPRESSION OF CHINESE LADIES' FEET.

tions formed under the laws of the State of California, for the purpose of carrying on and conducting the business of mining," approved March 30, 1874, approved April 23, 1880, was refused a reading.

Assembly bill No. 238, by Mr. Pindar, is to the effect that all contracts for the sale of shares of the capital stock of any corporation or association on margin, or to be delivered at a future date, shall be void; and any money paid on such contracts may be recovered by the party paying it, by suit, in any court of competent jurisdiction.

Senator Hill has introduced a good bill. It requires all buildings in process of erection or hereafter to the built, which may or shall be used for churches, school-houses, operas, theaters, lecture-rooms, hotels, public meetings, town halls, or which shall be used for any purpose whereby a collection of people may be assembled together for religious worship, amusement and instruction, shall be so built that all doors leading from the main halls shall be so awning as to open outward. All means of egress from the buildings must be by doors opening outward. In all incorporated cities and towns, the Mayor or other corporate authority is authorized to close and prohibit all public buildings hereafter erected from being used, in violation of this act,

## A New Book Holder.

From among the many convenient articles of general utility produced recently by Pacific coast inventors we select one that meets a requirement which has heretofore been unsupplied, and is in a comparatively new field for the exercise of inventive genius.

Mr. Wm. B. Daugherty, of Carson City, Nev., has patented through the MINING AND SCIENTIFIC PRESS Patent Agency, a novel device for holding an open book, the device being hung from the shoulders of the reader in such a manner as to have the book in proper place for reading, allowing the reader to assume any position he may desire, and leaving his arms and hands free.

It consists of a base upon which the book rests, and from the sides of this base are two curved arms which are so formed as to hook over the shoulders of the reader and are properly braced to hold the base in the same relative position, whether the reader is in a sitting, standing or reclining position; it also consists of holding devices for the book and other details of construction, all of which are hereinafter more fully described.

Let A represent the base upon which the

book rests. This base may be constructed of any light material, and is oblong in shape, having one end curved or concaved, as shown, for the purpose of better fitting the person of the reader. Extending from the concaved inner end of the base, A, are curved arms, B, B, which are so formed as to hook over the reader's

shoulders and hold the base in place; braces, c, c, reach midway from the arms, B, B, to the base, A, and serve to stiffen the parts. These braces are formed with the arms by bending a single arm for each of the arms so that the hooked portion is doubled while the parts separate at the arm brace as shown. The arms, B, B, are held together by a cross piece, d, which prevents their spreading and slipping from the shoulders. Across the base, A, at a point between the braces, c, c, is placed a wire, D, which stands a short distance above the base, and has projections, E, formed by bending it near the ends, as shown, so that the lower end of an open book may be placed beneath, and the leaves held down. Another projecting portion, G, at the center, extends down to the base and acts as a stop to prevent the book from sliding down beneath the cross bar. The other end of the book is held in place by means of a clamp, H.

This clamp, H, consists of a wire rod which is fitted to slide along beneath the base, A. This rod is bent up at right angles, passing through a slot near the top of the part, A, and extending to a sufficient height to hold an ordinary book, being so formed at its upper end as to press down upon the opposite pages of an open book. This clamp is adjustable so that when a book is to be removed the clamp is pushed up away from the book, allowing it to

become free. It is also curved slightly backward at the point, where it is bent to pass up through the slot so that it will have an elastic pressure upon the book leaves. When it is desired to place a book in this holder the book is opened, and the lower end placed under the curved holding wire, D, and the clamp, E, brought into proper position to hold the upper end of the book. The curved ends of the arms, B, B, are then hooked over the shoulders, and the book is then firmly held in position. This device is very convenient, as the reader may have his hands free for writing or other occupation, and may read in any position desired.

## Chinese Women's Feet.

An American missionary, Miss Norwood, of Swatow, some time since described in a New York Times paragraph how the size of the feet is reduced in Chinese women. The binding of the feet is not begun until the child has learned to walk. The handages are especially manufactured, and are about two inches wide and two yards long for the first year, five yards long for subsequent years. The end of the strip is laid on the inside of the foot at the instep, then carried over the toes, under the foot, and around the heel, the toes being thus drawn toward and over the sole, while a bulge is produced on the instep, and a deep indentation in the sole. Successive layers of bandages are used till the strip is all used, and the end is then sewn tightly down. The foot is so squeezed upward that, in walking, only the ball of the great toe touches the ground. After a month the foot is put in hot water to soak some time; then the handage is carefully unwound, much dead cuticle coming off with it. Frequently, too, one or two toes may even drop off, in which case the woman feels afterward repaid by having smaller and more delicate feet. Each time the handage is taken off, the foot is kneaded to make the joints more flexible, and is then bound up again as quickly as possible with a fresh handage, which is drawn up more tightly. During the first year the pain is so intense that the sufferer can do nothing, and for about two years the foot aches continually, and is the seat of a pain which is like the pricking of sharp needles. With continued rigorous binding the foot in two years becomes dead and ceases to ache, and the whole leg, from the knee downward, becomes shrunk, so as to be little more than skin and bone. When once formed, the "golden lily," as the Chinese lady calls her delicate little foot, can never recover its original shape.

Our illustrations show the foot well bandaged and unbandaged, and are from photographs forwarded by J. W. Bennington, R. N., to the Scientific American, and who writes: "It is an error to suppose, as many do, that it is only the upper ten among the daughters of China that indulge in the luxury of 'golden lilies,' as it is extremely common among every class, even to the poorest—notably the poor sewing women one sees in every Chinese city and town, who can barely manage to hobble from house to house seeking work. The pain endured while under the operation is so severe and continuous that the poor girls never sleep for long periods without the aid of strong narcotics, and then only but fitfully; and it is from this constant suffering that the peculiar sullen or stolid look so often seen on the woman's face is derived. The origin of this custom is involved in mystery to the Westerners. Some say that the strong-minded among the ladies wanted to interfere in politics, and that there is a general liking for visiting, chattering and gossip (and Chinese women can chatter and gossip), both and all of which inclinations their lords desired, and desire, to stop by crippling them."

Of late there has been considerable activity among the China miners at the Lava Beds, near Oroville, Butte Co., for some reason or other. The Record says old claims that had been abandoned are being relocated, and gangs of men put to work. On a tract formerly owned by J. C. Gray, a gang has been at work during the last month, and have been taking out all the way from 75 cents to \$2 to the rocker.

For carpenters and builders there is nothing to do on the Comstock. Men who formerly worked gangs of from 40 to 60 men are now glad to get a job for themselves at putting in a patch of sidewalk, putting down a crossing or repairing a broken fence.

The new iron bridge over the creek at Oakland to be built by the narrow-gauge road, will be 212 ft. long, the diameter of the turn-table 32 ft. 8 inches, the entire length of the bridge being 1,030 ft. It will cost \$25,000.

RUSSELL KING, formerly of Stockton and several years a compositor and foreman in this office, died recently at Hanford, in his 28th year. He is well remembered for his genial and kindly disposition and his many good qualities.

A NUMBER of the miners who came down from Alta, Utah, after the terrible snow-slides, have concluded to direct their attention to other camps where danger is not so thick and fast.

THE Spring Valley Gold Co., Butte Co., received two electric light engines from New York, last week. The express charges on them were over \$300.



## Population, 50,152,559.

The Census Bureau has figured so far upon the returns of population as to reach the conclusion that the total, exclusive of Alaska and that region west of Arkansas known as the Indian Territory, is 50,152,559. But while these figures are official they are not final, and may be changed hereafter in the revisory calculations, though it is not likely that such possible changes will go above the units, tens or hundreds columns. For all practical purposes the total population of the United States and Territories, exclusive of Alaska and the Indian Territory, may be stated at 50,152,000. The increase since 1870 has been 11,266,024, or nearly 9%. The present population of the Pacific States and Territories, namely, California, Oregon, Nevada, Washington, Idaho, Arizona and Utah, is officially stated as follows:

California.....	864,636
Oregon.....	174,767
Nevada.....	62,265
Washington.....	75,120
Idaho.....	32,611
Arizona.....	40,441
Utah.....	143,907

Total.....1,393,797

The increase of this division of the country since 1870 has been 451,866, or 43%. The increase in Nevada was but 6%, which is the lowest, while in Washington Territory it was 100%, which is the highest rate. The per cent. of increase in the Pacific division is greater than in any other. In the Eastern division, including New York, New England, New Jersey and Pennsylvania, the per cent is but 18. In the Western division, including Missouri and the Territories of Dakota, Wyoming and Montana, 34%. In the southern division, excluding Missouri and including all the other old slave States, 34%. In the district of Columbia, 35%. It is now conceded that the apparent large increase in the Southern States is due to the fact that this census was taken there with more regard to exactness than any preceding one, while that of 1870 was done in a slovenly and careless manner, not reaching a large mass of the population. There is but one city in the United States or on the American continent that contains over 1,000,000 population—New York. There are three others that contain over half a million; three others above 300,000; three others above 200,000, including San Francisco, and ten others above 100,000. The following is a carefully revised list of the cities that overgo 30,000 inhabitants each, California having two of them. It will be a good thing to keep for future reference:

New York.....	1,306,590	Columbus, O.....	51,605
Philadelphia.....	846,934	Paterson.....	50,837
Brooklyn.....	596,689	Toledo.....	50,143
Chicago.....	503,304	Charleston.....	49,409
Boston.....	362,535	Fall River.....	49,000
St. Louis.....	350,522	Minneapolis.....	46,387
Baltimore.....	332,190	Scranton.....	45,850
Cincinnati.....	255,708	Nashville.....	45,461
San Francisco.....	233,956	Reading.....	45,280
New Orleans.....	216,140	Hartford.....	45,253
Cleveland.....	160,142	Wilmington.....	42,499
Pittsburg.....	154,831	Camden.....	41,683
Buffalo.....	155,137	St. Paul.....	41,408
Washington.....	147,307	Lawrence, Mass.....	39,178
Newark.....	136,400	Dayton.....	35,677
Louisville.....	123,645	Lynn.....	38,284
Jersey City.....	120,728	Denver.....	35,630
Detroit.....	116,342	Oakland, Cal.....	34,556
Milwaukee.....	115,578	Atlanta.....	34,398
Providence.....	104,850	Worcester.....	33,913
Albany.....	90,903	Portland, Me.....	33,810
Rochester.....	89,363	Memphis.....	33,593
Allentown, Pa.....	78,681	Springfield, Mass.....	33,340
Indianapolis.....	75,074	Manchester, N. H.....	32,630
Richmond.....	63,803	St. Joseph, Mo.....	32,484
New Haven.....	62,882	Grand Rapids.....	32,015
Lowell.....	59,485	Wheeling.....	31,266
Worcester.....	58,205	Mobile, Ala.....	31,205
Troy.....	56,747	Hoboken.....	30,999
Kansas City.....	55,813	Harrisburg.....	30,762
Cambridge, Mass.....	52,746	Savannah.....	30,681
Syracuse.....	51,791	Omaha.....	30,513

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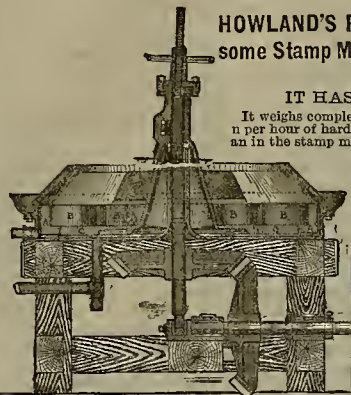
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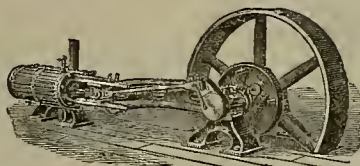
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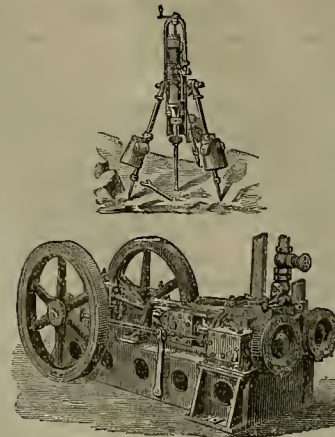
Believing that a journal of this kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Farquharson, Wright & Sanders, S. H. Williams, Thos. J. Welsh, E. Huene, John Marquis, B. McDougal & Son, Wm. Mosser, Wm. Curlett, Meeker & Banks, W. O. Hoagland, S. & J. Newsom, B. Henrickson

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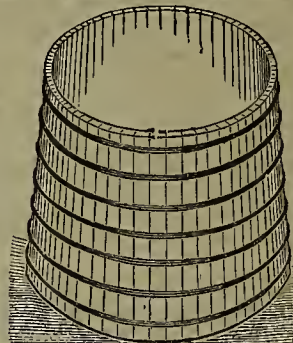
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The Great Storm.

There has been a great storm, in fact one of the most severe ever known in the State, and the water in the great rivers of the interior has reached a higher mark than has been heretofore recorded. There have been grievous losses by overflow and washouts and landslides at different points in the northern half of the State. There is also the indirect loss and inconveniences of having the ground rendered wholly unfit for work, and idleness is thus forced upon some farmers, while others have had to lament the destruction of their property by the floods. From Shasta, yes, even from the Columbia river on the north, down to Sacramento valley on the south, the disasters have been numerous although within this borders of our State there has been no loss of life reported. Our space will not permit us to give all the details of the floods which have come to hand by telegraph, but we will call a few from which others may be inferred.

At Shasta on Sunday, the rainfall in four hours and thirty minutes was 10.4 inches. The rain just poured down in sheets. The bridges over the large creek, near the Union church, were all carried away, and came near carrying away the residence of I. Bshrie. During the progress of the storm a large landslide occurred, carrying off a large piece of the mountain back of the residence of William Daniels. Such a rain storm has never been known at Shasta.

The Sacramento river was higher than ever known before. Considerable damage has been done. Nearly all the strams and creeks on the roads leading to Shasta are so high that it is almost impossible to cross them. The rainfall for the season, to Feb. 2d, was 80.8 inches.

At Marysville, nearly five inches of rain fell during the storm up to Sunday, swelling the Yuba river to a greater height than was ever known. In the notable flood in 1875, when the city was inundated, the highest flood marked was 16 ft. Sunday at 3 o'clock the water-gauge marked 17 ft. and 4 inches, when it began to recede. The levees were guarded in all weak places. There is no water inside the levees, except surface water on some back streets. The farms lying in the flooded districts of Sutter county will undoubtedly suffer considerable loss. Reports from there are meager, travel being cut off by the water.

At Sacramento on Monday, the Sacramento river reached its highest point ever attained here—26 ft. and one inch; to-night the river stands at 25 ft. 11 inches. The breaks in the levee 3½ miles below the city are not so bad as at first supposed. On the Yolo side there are three breaks in the levee below the city, one of them is opposite the southern boundary of the city. The town of Washington is inundated by back water.

At Napa the river was a foot higher than ever before, and the water was over a foot deep in the streets. In many of the stores the water did considerable damage. Fences and several houses were washed away. The water subsided on Monday, and the streets presented a picture of destruction. Sidewalks and culverts were washed away, and the town was covered with a deposit of mud from 5 to 12 inches deep. The railroad roadbeds were washed out in many places.

At Stockton the slough rose seven ft. above low water mark, and the other sloughs were bank full. No damage is reported in the immediate vicinity of Stockton, unless it be to grain lying out in sacks in the fields.

At Nevada City the water in Deer creek is 15 inches higher than it was in the year 1861, at the time of the heavy floods. Considerable damage has already been done. Foot bridges have been carried away, and washouts and landslides are reported.

At Columbia, Tuolumne county, the storm is pronounced by far the severest storm ever had in that section, and on Monday it was raining hard with no sign whatever of clearing up. Travel by stage had been interrupted. They had no mail or express for two days.

At Merced on Tuesday, the Merced river was at a very high stage, overtopping the banks and suspending all travel across that stream by damage to ferries. The Coulterville stage, Monday, hound for Merced, connected with the passenger train at Turlock. This was the only way passengers from the north side of the river could reach Merced.

At Santa Cruz it is said that the damage caused the powder works property will approximate thousands of dollars to repair. Considerable damage was done to the property of Davis & Lowell at their lime-kilns. No mails or express matter have been received here from Friday to Monday. An engine of the South Pacific Coast railroad was reported huried by a slide in the road. The Howe truss bridge of the Santa Cruz and Watsonville railroad, or two-thirds of it, lies on the beach a quarter of a mile below where it went into the bay.

The railroad trestle work across the Salinas river, at Castroville, was carried away by the high water this morning, this being the second time this winter.

The bonanza mines have discharged 80 men from the slopes, the cause assigned being that the ore was getting to be of too low grade to pay mining and milling expenses. Some pay ore remains, and prospecting about the old slopes is continued.

A POLICE raid on keno games in St. Louis on Monday night resulted in the capture of 150 persons.

Chair Manufacture in San Francisco.

This establishment of Heywood Bros., chair manufacturers, occupies three floors in the large building, Nos. 559 to 595 Mission street. The business comprises the manufacture of cane and wood seat chairs, and rattan and reed furniture of all kinds. The house in this city is the sub-growth of the home center at Gardner, Mass., that factory having been established so long ago as the year 1826, by Mr. Levi Heywood, now the oldest chair-maker in the United States. This gentleman, although between 80 and 90 years of age, is still actively engaged in his chosen occupation, which he has assiduously followed for more than half a century.

The home establishment of the Messrs. Heywood brothers claims the honor of being one of the largest chair factories in this country, giving employment to about 1,100 hands, and turning out not less than 2,000 chairs per day. The works include within their grounds a machine shop, iron foundry and varnish factory, where is made all the complicated machinery, castings and varnishes used in the manufacture of the chairs. For years the company have imported their rattan direct from Calcutta, in quantities not only to suffice their own consumption, but to largely meet the demands of other similar establishments throughout the Atlantic States.

In order to bring their goods more directly before the public, branch factories and wholesale depots have been located in New York, Philadelphia, Baltimore and this city, the latter being under the management of Mr. S. W. Fuller, formerly connected with the firm of Huls & Co., New York. The growth and prosperity of the factory in this city during the last five years sufficiently evinces the fact that this concern is fixed upon a firm and abiding basis. In their sample rooms, on Mission street, may be found fully 300 different styles of goods, embracing rattan chairs, rockers, patent rockers, sofas, music stands, foot-stools, ladies' work baskets, etc.

Formerly all articles in this line were brought from the East to this coast "made up," as the technical phrase has it, in assorted lots; and since lightness and bulkiness characterizes these goods, a high rate of measurement was the inevitable result, involving a large outlay of capital for freight purposes alone. This was found to be so serious a detriment to the business that the company determined to establish a factory in San Francisco for this particular branch of the trade. The plan was put into execution about one year ago, and now, about 20 boys and girls are employed in putting up the work; a craft which seems peculiarly adapted to the facile hands and nimble fingers of youth. To deftly fashion a modern rattan chair-seat, or unite strength, durability, lightness and grace in fabricating the back of a fancy rocker out of the attenuated filaments of cane and bamboo, requires the creative skill of hands alone. Elaborate machinery comes powerless to the task; a conclusion rendered entirely obvious by a glance at the beautiful articles on exhibition in the salesroom.

The business is steadily on the increase, the house finding a ready sale for its wares throughout this coast, including British Columbia, Mexico, Central America, Australia and Japan.

Besides the work already mentioned as being done here, there is required an essentially home manufactory, giving employment to about 50 hands, in the various departments of setting up, varnishing, polishing and upholstering each work as is brought "in the rough" from the East.

The aim of the factory is to supply country dealers with everything in the line of a chair, from the old-fashioned wood seat, so highly prized by our grandfathers, to the new and beautiful designs of East Lake and Queen Anne in maple, oak, walnut and ebony gilt.

Finally, to the good name of this house it may be said that it buys all of its varnishes, in no inconsiderable quantities, from San Francisco makers and dealers, thus clearly evidencing that the proprietors practice as well as believe in the principle, "Live and let live."

THERE are about 150 Chinese in San Diego county. There are 39 school districts, taught by 43 teachers. The highest school is located on Smith's Mountain, 4,700 ft. above the level of the sea. School property is approximately valued at \$20,000. Something like 1,000 school children are recorded.

KARSTENS' BEER FAUCET.—Charles Karstens, corner Jackson and Sansome Sts., in this city, has recently invented a beer faucet which possesses several advantages. It is very simple in construction. The faucet screws into the head of the barrel and there is no possibility of its flying out, or of the escape of any gas. The key of the faucet is so made that it will not wear out, nor get leaky, because there is no hammering to get the faucet in. Brewers in using this do not need wooden plugs, nor does the hole get enlarged. The patent faucet will outlast the barrel, and the inventor claims it will outlast any other form of faucet. With this Mr. Karstens says only half the number of faucets is required, as any one can change and set them with the necessary key; while without the key no one can tamper with or draw the beer. He is fully convinced that the saving in the cost of the number of faucets will alone pay for the cost of the patent faucet.

News in Brief.

TRAINS are delayed by heavy snows in Minnesota.

VANDERBILT owns \$50,000,000 in Government bonds.

THE 3% dividend of the Central Pacific stock is being paid.

THE Census Bureau at Washington employs 1,247 persons.

DIPHTHERIA rages to an alarming extent at Roseburg, Or.

THE fund being raised for General Grant has reached \$225,000.

KING KALAKUA, ruler of the Hawaiian islands, is in this city on a visit.

NEARLY 11,000,000 lbs. of salmon were taken from California waters last year.

RAINS and floods continue in the south of Spain, and much damage has resulted.

CAPTAIN HOWGATE thinks there is no need for anxiety for the safety of the Jeannette.

AT Portland, Or., scarlet fever has assumed an epidemic form, and is of a malignant type.

CHINESE New Years has been celebrated in this city for a few days by our celestial population.

THE jury in the State trials at Dublin were discharged, being unable to agree.

SKOBLOFF has been appointed Russian General of Infantry and decorated with the Order of St. George.

THE President has approved the bill placing General Ord on the retired list, with the rank of Major-General.

A LANDSLIDE in the Santa Cruz mountains Saturday, destroyed a lumber camp and buried eight Chinamen.

DURING the past six months 131,000 mors immigrants arrived in the United States then for the same period in 1879.

THE Senate Foreign Relations Committee voted on Saturday to report back the Chinese treaties favorably without amendment.

CHICAGO and all the cities along the Lake Shore road are suffering from a snow blockade. Freight traffic is almost entirely suspended.

A HORSE and rider were precipitated into an old mining shaft, 25 ft. deep, near Grass Valley, killing the former and badly injuring the latter.

ONE cloth manufacturer in St. Petersburg has discharged 1,500 weavers at one stroke, because of the slack trade, and other mills are on short time or closing.

MANY bankruptcies are imminent in Moscow on account of the depression in Russian industries, and the Minister of Finance has instructed inquiry into the causes.

THE King of the Netherlands will be petitioned to make diplomatic representations to Great Britain to terminate the Transvaal war and make the Boers independent.

THE Government has commenced a suit at New York against the Central Pacific Railroad Co., bonds being filed by the company to await a decision of the Court in the sum of \$750,000.

ONE Chicago grain firm shipped 45,325,000 bushels of corn during the year 1880. The same firm also shipped about 27,000,000 bushels of wheat, and smaller amounts of other cereals.

THE New York Times reports progress of the scheme and organization to establish in that city Zoological Gardens similar to those in London and Paris. A meeting of the stockholders will be held February 10th. Plans of the various buildings are completed.

THE Zulu King, Cetewayo, is still confined in the old castle at Cape Town, where, guarded by two soldiers, his only occupation is to sit on the ramparts and gaze at the vessels in Table bay, or watch the trains go by between the outer walls of the fort and the sea beach.

THE lecture fever has struck France, and no less a personage than Jules Ferry is making arrangements for a course on education, to be delivered in the French language. Mrs. Westlake, Oscar Browning and Walter Pollock will be among the speakers from England.

A PROSPECTUS has been issued in Paris by the Submarine Telegraph Co., the object of which is to connect all Central America with the United States and Europe by cable with tributary land lines, to be laid down from Balise to Cuba, Spain having granted a concession therefore.

ONE of the burglars who blew open the safe of the South Chicago Iron and Steel Works, the early part of this week, was captured by detectives this morning with \$4,000 in his possession. The amount taken was over \$10,000. The name of the captured man is withheld by the police authorities.

THE House Committee on war claims agreed to report favorably to the House the bill providing for the allowance of certain claims favorably passed upon and reported by the accounting officer of the Treasury Department. Nine hundred and ninety-six claimants are represented in the bill, the majority of them coming from the States of Kentucky, Tennessee and West Virginia. These claims vary from \$3,000 to \$4,000, and aggregate between \$200,000 and \$300,000.

THE public debt statement shows the decrease in the public debt during January to be \$7,382,167.71; cash in the Treasury, \$221,674,535.08; gold certificates, \$6,541,480; silver certificates, \$46,890,220; certificates of deposit outstanding, \$8,630,000; refunding certificates, \$867,250; legal tenders outstanding, \$346,681,016; fractional currency outstanding, \$15,520,433.12, less amount estimated as lost or destroyed by Act of June 21st, 1879, (\$8,375,934), \$7,144,499.12.

Our Agents.

OUR FAIRREADS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send one but worthy men.

J. F. OSBORNE—San Francisco.  
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G. W. MCGREW—Santa Clara county.  
M. P. OWEN—Santa Cruz county.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
N. E. BOYD—San Bernardino Co.  
JARED C. HOAG—California.  
B. W. CROWELL—Colusa and Yolo counties.  
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The Californian.

THE RISING MONTHLY OF THE DAY. YEARLY SUBSCRIPTION \$4. Single number 35 cents. AGENTS WANTED in every town and village of the United States to canvass for this popular magazine. The most liberal commissions will be paid to responsible parties. This is a chance to make money at your own home. Address THE CALIFORNIA PUBLISHING CO. (P. O. Box 2319) 202 Sansome St. S. F.

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Form the basis of many of the Ague Remedies in the market, and are the last resort of physicians and people who know no better medicine to employ for this distressing complaint. The effects of either of these drugs are destructive to the system, producing headache, intestinal disorders, vertigo, dizziness, ringing in the ears, and depression of the constitutional health. AYER'S AGUE CURE is a vegetable discovery, containing neither quinine, arsenic, nor any deleterious ingredient, and is an infallible and rapid cure for every form of Fever and Ague. Its effects are permanent and certain, and no injury can result from its use. Besides being a positive cure for Fever and ague in all its forms, it is also a superior remedy for Liver Complaints. It is an excellent tonic and preventive as well as cure, of all complaints peculiar to malarious marshy and miasmatic districts. By direct action on the liver and biliary apparatus, it stimulates the system to a vigorous, healthy condition.

FOR SALE BY ALL DEALERS

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

THE MINING AND SCIENTIFIC PRESS finished its 41st volume with its last publication. We do not know the circulation of the paper in this community, but we do know that every mechanic and miner ought to take it, for by so doing they would benefit themselves far more financially than they are aware of.—Shasta Courier.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

Metals.

[WHOLESALE.]	
WEDNESDAY M., Jan. 26, 1881.	
IRON.—	
American Pig, soft, ton.....	30 00 @ 33 00
Scotch Pig, ton.....	25 00 @ 26 00
American White Pig, ton.....	27 00 @ —
Oregon Pig, ton.....	41 @ 8
Reinforced Bar, 100 lb.....	7 00 @ 8 00
Nail Rod.....	— @ 9 1/2
Norway, according to thickness.....	8 1/2 @ 9 1/2
STEEL.—	
English Cast, B.....	16 @ 18
Black Diamond, ordinary sizes.....	13 @ 15
Drill.....	9 @ 10
Flat Bar.....	— @ 16
Flow Steel.....	9 @ 10
COPPER.—	
Ingot.....	— @ 52
Sheet.....	— @ 20
Sheathing, Tinned 14x48.....	— @ 42
Nails.....	— @ —
Bolts.....	38 @ 42
Old.....	— @ 18
Bar.....	— @ 22
Precipitate, 100 fine.....	18 @ 19
LEAD.—	
Pig.....	42 @ 5
Bar.....	— @ 6
Pipe.....	— @ 8
Pipe, 100 lb.....	— @ 8
Sheet, Discount 10% on 500 Bags.....	— @ 2 10
Drop, per bag.....	— @ 2 10
Buck.....	— @ 2 30
Chilled ".....	— @ 2 50
TIN PLATES.—	
10x14 I O Charcoal.....	— @ 10 50
10x14 I O Oak.....	10 00 @ 10 50
Bacon Tin.....	— @ 25 00
Australian.....	— @ 20 00
" " " " 20x28.....	20 00 @ 21 00
ZINC.—	
By the Cask.....	— @ 10
Zinc, Sheet 7x3 ft. 7 to 10, lb. less than cast.....	10 @ 11
NAILS.—	
Assorted sizes.....	4 00 @ 4 75

Gold, Legal Tenders, Exchange, Etc.

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SAN FRANCISCO, Feb. 2, P. M.

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## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### DIVIDEND NOTICE.

OFFICE OF THE

### Silver King Mining Company.

San Francisco, February 1, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 14) of Twenty-five (25) Cents per share was declared, payable on Tuesday, February Fifteenth (15), 1881, at the office of the Company, Room 19, 323 Montgomery Street, San Francisco, Cal. Transfer books will be closed on February Tenth (10), 1881.

JOSEPH NASII, Sec'y.

### DIVIDEND NOTICE.

OFFICE OF THE

### Standard Consolidated Mining Company.

San Francisco, February 2, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, dividend (No. 25) of Seventy-five (75) Cents per share was declared, payable on Saturday, February Twelfth (12), 1881, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.

Office—Room No 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

### ANNUAL MEETING.

The Annual Meeting of the Stockholders of the REAL ESTATE AND BUILDING ASSOCIATES will be held at the office of the Company, No. 230 Montgomery Street, on Monday, the seventh (7) day of February, 1881, at twelve o'clock noon of said day.

LUIS F. EMILIO, Sec'y.

### Booth Gold Mining Company.—Location of principal place of business, San Francisco. Location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2) day of February, 1881, an assessment, No. Three (3), of Three (3) Cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room No. 44, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Seventh day of March, 1881, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Fourteenth (14) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors.

GEO. R. SPINNEY, Sec'y.

Office—Room No. 44, No. 310 Pine Street, San Francisco, Cal.

### Blue Bird Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Globe District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Eighth (8) day of January, 1881, an assessment, No. one (1), of Five (5) Cents per share was levied upon the capital stock of the corporation, payable immediately, in U. S. gold coin, to the Secretary, at the office of the Company, No. 10 Market Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Fourteenth (14) day of February, 1881, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the Fourteenth (14) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

W. H. KNIGHT, Sec'y.

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## '49 AND '50.

MR. JOHN VANCE CHENEY'S new historical story of early days upon this Coast will be commenced in the next number of "The Californian."

A NEW SERIAL STORY will be commenced in the next number of THE CALIFORNIAN which will run during the remainder of the year. It is entitled "'49 and '50," and is a story of early days upon this coast. The author is Mr. John Vance Cheney, whose articles in the leading Eastern magazines and in THE CALIFORNIAN have received such wide and merited recognition. Mr. Cheney has had this story in preparation for THE CALIFORNIAN for some time. Competent critics, to whom it has been submitted pronounce it at once realistic and fascinating. The stirring events of 1849 and the succeeding year are vividly pictured. Absolute truthfulness of impression is sought rather than idealization. A thread of romance runs through the work, and the interest is sustained to the end.—(Note Book).

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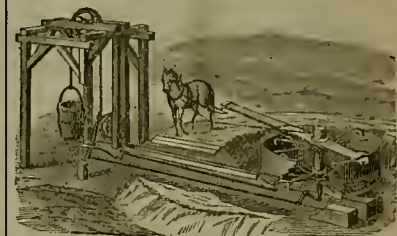
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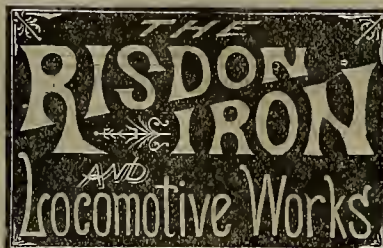
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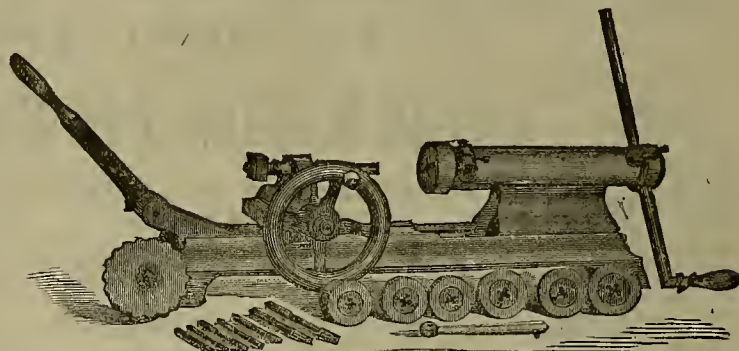
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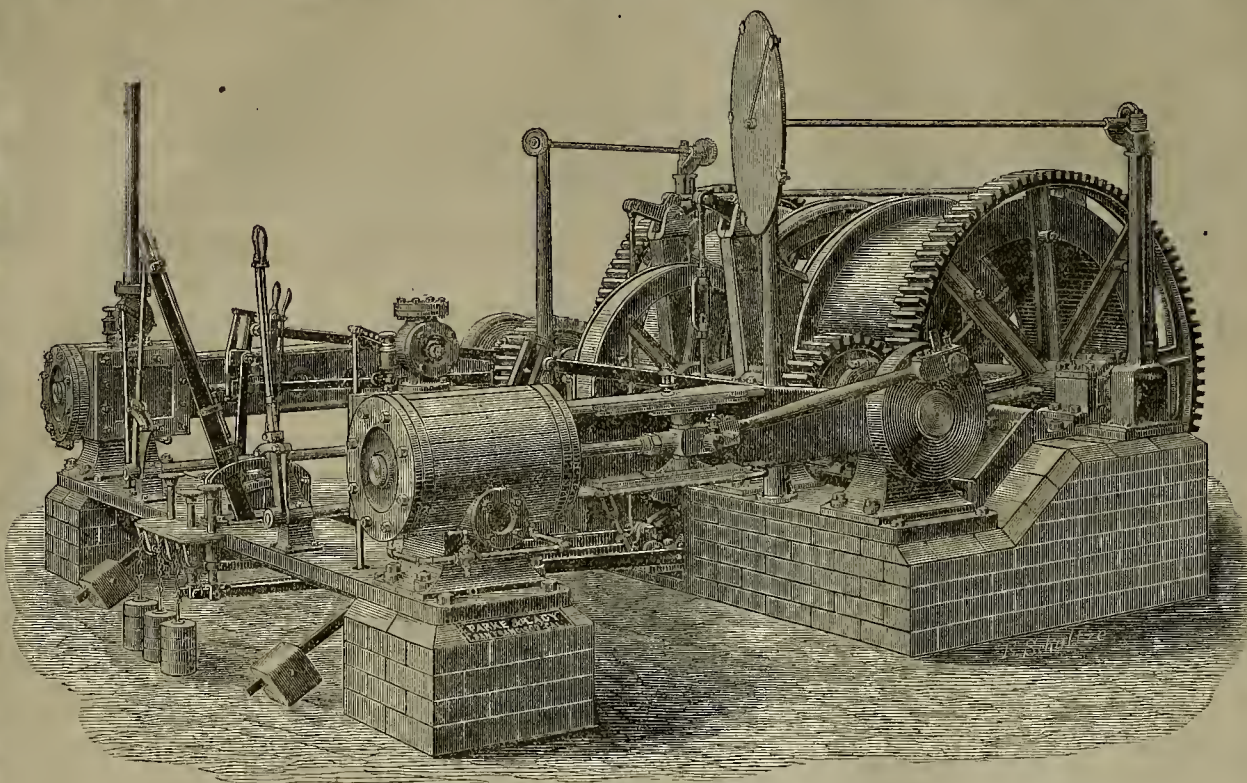


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SAN FRANCISCO, SATURDAY, FEBRUARY 12, 1881.

VOLUME XLII  
Number 7.

## Alaska Mines.

Arizona to the south and Idaho to the north have been the latest centers of mining excitement; but now it looks as if the northern fields were to be extended to Alaska. For the past few months rumors of rich discoveries of ores at different points in Alaska have been rife. The steamer *California*, which arrived this week, brought news that great excitement now prevails in Alaska about the newly discovered Takon mines, on the Takou river, some 80 miles only, north of Sitka.

The quartz croppings, which have occasioned this present excitement, were found some two months since, near the Takou river. Ore from the prospects has assayed up into the thousands. There are now about 50 men at the new camp, and some 11 or 12 claims have been taken up.

There is a great deal of snow in the region about the new mines, and it will be impracticable for miners to do much before the end of March. The snow is very deep. A road is being cut through to the new mines. The steamer *California* will take back a lot of timber for the district.

Of course, as it is with all new gold discoveries, there is probably a great deal of exaggeration about the richness of the "mines," and the fact that the deep snow prevents exploration will warrant such stories for some time to come.

The people at Sitka and throughout will probably be able to take care of all the claims there are to be taken up without any assistance from California, so that our miners who are looking out for jobs, will probably do as well to stay at home and let the Alaskans work the Alaskan mines.

## Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last.

Donations to the museum: Seven specimens of ores from John T. Reed, San Bernardino county; from Capt. C. L. Hooper, of the U. S. revenue steamer, *Corwin*, tanned seal skin vest, made by Innuits at Point Belcher; also two fur shirts; also pair Inuit boots; W. J. Fisher donated four bottles containing crustacea from Kodiak island, Alaska; from C. G. Yale, Indian implements, bones of stone and one bone; also the left valve of *Schizothorus Nuttallii* found in a cut while digging the Army street sewer in San Francisco, in 1880; from W. H. J. Brooks, Bakersfield, Kern county, plant and fiber growing along the margins of streams in Kern county; also, from Capt. Hooper, jute fiber and nettle fiber. A very interesting and exhaustive paper was read entitled "Sericulture in California," by Miss T. H. Hittell. Dr. Hermann Behr read a paper on "A Fungoid Growth on the Grape Vine." Mr. J. G. Lemmon presented a list of some of the new and rare ferns of California and Arizona. He also read a paper on "Pacific Coast Arctiids," illustrating his remarks with specimens of the various locusts found in this State. Paper on "Sea Otter" by W. H. Fisher, Alaska, was read by the Secretary. Thomas E. Fraser was elected a life member; and Henry E. Mathews, Frank Jaynes and Rev. Horatio Stebbins were elected resident members.

**MECHANICS' INSTITUTE.**—The annual election of the Mechanics' Institute was held on Tuesday. Only one ticket was in the field, which was elected with the exception of C. N. Cook, who was defeated by C. Waterhouse. One hundred and forty-nine votes were polled, and the following are the names of the new Trustees: Richard J. Gray, Assistant General Freight Agent Central Pacific railroad; James Spires, foundryman; James Drury, contractor; Asa B. Wells, Mechanics' mill; George Spaulding, printer; A. W. Starbird, lumber dealer; C. Waterhouse. The new officers will be installed in March.

## Mining Property in Mexico.

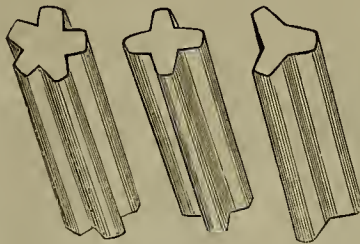
Considerable attention is now being turned to mining matters in Mexico, and this coupled with the fact that several important railroad enterprises are being inaugurated, leads to the conclusion that that country will become more familiar to the Americans than it has hitherto. There are many persons of late who have been through the northern portion of Mexico on the lookout for mining properties, but they have not seemed so easy to acquire as might be, nor are all the conditions for working them as favorable as in this country, notwithstanding labor is cheap.

There are other considerations, too, not well understood, that detract from the value of properties there. We most recently a gentleman who has just returned from an extended trip through Mexico, and who corroborated our impression relative to the difficulty of acquiring property there. In an interview with the gentleman referred to, he gave us in effect the following statement:

We left New York city in March, arrived in Matamoros about April 20th. From there we traveled muleback to the city of Chihuahua, which we found so unhealthy—small-pox, yellow fever and other malignant types of disease prevailing—that we pushed on to Durango, our objective point being Alamos, State of Sonora. Durango is virtually a city of gamblers and cock-fighters, and consequently does not enjoy that perfect peace and tranquillity that characterizes the moral hamlets of the United States. A governmental mint is located here, to which great quantities of bullion are sent. There seems to be a fair amount of business done, but there is much poverty noticeable. In short, Durango can truly be called a city of refuge, where congregate the vagabond populace of adjoining States. There is a defined socialism, a seclusive aristocracy descended of the old Castilian hidalgos, who are courteous, refined, exceedingly hospitable, very conservative of their entertainment of strangers until they are well assured of their gentility, etc. Here, as elsewhere throughout Mexico, exists the greatest suspicion of all strangers, Americans especially, to the extent that I have known them to refuse the most extravagant offers for real estate; and I am sure desirable properties cannot now be bought simply by a process of hargain and sale. Indeed, real estate transactions involve as much diplomacy and formality as would be used by great governments in national matters. This is not so much the case in Chihuahua, where the influence of American thrift and enterprise is already felt, or to where the Apache in times past has paid predatory visits; here they are eager to sell, and do, for incredibly low figures. In the great "Anro" basin of Sonora, that section contained within the limits of Arispa and Souqui to the north and south-west, and Moraa to the southeast, a country

which tradition and investigation has determined beyond all question as the particular place of deposit of the great mass of gold, money, however much is offered, is no inducement to sell, for they say, "What need have we for your money when just beyond our doors we can pick out all the gold we have need for, a bank that never suspends and enduring as time itself?"

If American capital seeks investment in the most desirable portions of Mexico it must command a territory not yet entered upon by a



Steel Bars for Mining Drills.

single American, a section alternately mining and agriculture lands comprised within the limits I have mentioned. The immigration to Chihuahua and Sonora has hitherto misdirected. The geology of California is in no wise the geology of Mexico, consideration of this difference has not seemed to meet the attention of the hundreds who have mistaken "Scoria" for true rock, etc. It was my good fortune to have for my traveling companion Col. Rivera, a gentleman of wealth and position, and one of the most distinguished of Spanish engineers. He had visited Arizona, had followed the mountain down into southernmost Mexico, and his judgment was that all the indications led him to believe that the bulk of gold was in the region described. An effort is now being made to acquire large tracts of country about here and develop the mines, but I question its success until the railroads now being advanced into that undeveloped section can be made available for the safe carriage of ore. These lands are held under old Spanish grants, having the feudal consideration, and a good title cannot be obtained without a tedious process of polity and under a guarantee of good faith.

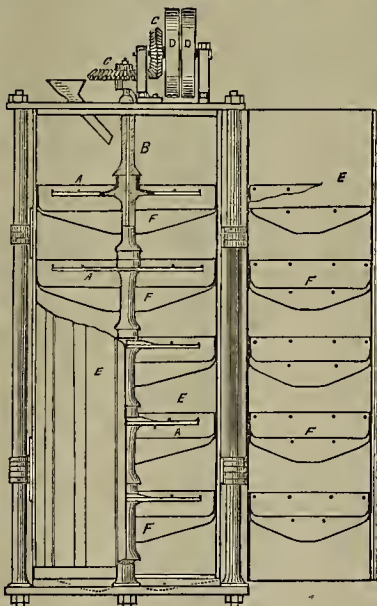


Plate Amalgamating Apparatus.

Another field for exploration is the pharmacopoeia flora of Sonora. Indigenous plants used by the Indians in the treatment of febrile diseases produce the happiest results without any of the ill consequences marking the administration of the strong remedies of our *materia medica*. I have seen typhoid troubles cured with a few simple herbs gathered from the hill sides, and so complete is their knowledge of the effect of these herbal plants that when the disease is determined, the remedy is invariably the same. When a more thorough investigation is made of this subject by scientific men, many additions will be made to remedial agents.

## New Amalgamating Apparatus.

Paul Desnolle, of Paris, France, has recently invented an amalgamating apparatus of limited dimensions and small cost, which will allow of the treatment of comparatively large quantities of pulp in a short time. The object is to place the amalgamation plates in a small space, so they can easily be got at to be cleaned or prepared, while, at the same time, they are under lock and key, and safe from molestation. In order to attain the end sought, a series of plates, alternately fixed and rotary, are arranged in a vertical series; and these being amalgamated, the pulp is caused to traverse them serially under the action of the centrifugal forces and gravity. The plates are inclosed in a casing with hinged sections, so that it may be opened to give access to the plates, or closed and locked when desired. The fixed plates are attached to this casing, and are made in parts; so that when the sections of the casing are turned on their hinges, the plates are divided, and appear like shelves. The whole interior of the apparatus may, in this way, be exposed. The fixed plates are considerably concave on the upper side, and, consequently, when divided, access is more readily had to their surface for the removal of deposited material.

In the engraving, A represents a series of amalgamated plates named on the shaft B. The latter is supported on bearings, and is revolved by suitable gearings. As steam power is conveyed through the bevel gears, C, from a belt running on pulleys, D.

A cylindrical casing, E, encloses the plates and shaft. It is made of sheet or wrought iron, for example, and is composed of four movable sections, hinged to upright rods extending from the bottom to the top plate of the apparatus. On the interior of each section is a series of amalgamating shelf plates, F, in the form of sectors, so that when the casing is closed they form fixed concave plates, which alternate with the rotary plates, A.

In the center of these plates, F, is an opening somewhat larger than the exterior of the shaft B, so as to leave a space between for the passage of the pulp.

The casing may be locked up by means of an ordinary padlock.

After the plates are amalgamated the case is closed, the pulp is admitted above, and the shaft B is rotated. The pulp falls in the conical part of the first plate, A, and expands over its surface. Under the influence of centrifugal force it runs over the edge and falls upon the fixed plate F, below it. This plate being concave, its own weight carries the pulp to the center and through the opening on the next rotary plate. From thence it passes to the next fixed plate, and so on, the tailings passing off below.

The number and dimensions of the plates, and the velocity of rotations should vary with nature of the gangue. When desired, the casing is opened and plates cleaned by a rubber, the amalgam being thus removed.

## Steel Bars for Mining Drills.

Drills made for mining purposes are usually made by forging from octagonal bars. The end of the bar, for an inch or so, is fixed into the required form of a drill, leaving the rest of the bar in its original form. Wm. A. Sweet, of Syracuse, N. Y., has patented, as an improved article of manufacture, rolled bars of steel, of the shape shown in the accompanying drawings.

This construction of drill steel produces a piece accurate in cross section, so that it can be worn up its entire length without re-forging. It consists of a blank rolled from a bar of steel, without forging or swaging. The steel bar, cut to proper length, is rolled into the form desired, ready, when taken in hand by the smith, to form a complete drill for use by adding a shank thereto; and having the same contour through its entire length, it can be used until it is worn up to the shank without any change of form.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eos

### Foundry Work on the Comstock.

EDITORS PRESS:—Some time since our local papers gave a short account of the casting of a balance wheel for the Yellow Jacket pump. I have visited the foundry of George Emmett, Gold Hill, where this immense piece of work has been done, and found this wheel so large that it was impossible to put it together without being obliged to cut through the building in several places. I believe it is the largest casting ever made, outside of San Francisco, on this coast. The center piece is 14 ft. in diameter and weighs over 21 tons. The rim is something over 30, and contains three tons of wrought iron. The entire weight of the wheel is 52 tons, and is altogether a very fine piece of workmanship. It was constructed under the direction of J. B. Pitchford, Superintendent of the foundry. It is now ready for removal, and as soon as the roads are in a fit condition it will be taken to the "Jacket mine." It is expected, all things being favorable, to have it put into position about the middle of this month, when I hope to be able to give you some account of the working of the same.

Business as a general thing is quiet. I understand that there was another draft yesterday, by which about 84 men were thrown out of employment. Yet, notwithstanding this, I still find considerable activity about the Hale & Norcross, which was destroyed by fire a few weeks ago; since which time the unused buildings of the Con. Virginia have been transferred to the scene of disaster, and now take the place of the burnt building. The debris having been removed, such machinery as was destroyed has been replaced by that from the Con. Virginia, and is entirely under cover, and things, I hope, will soon be in working order again.

Of course many of the old Comstockers feel very blue at the great depression in business, but I think there is too much capital invested in this locality to have the bottom fall out of everything so suddenly, and though dull at present I trust things will soon take a favorable turn. We often hear of "the darkest cloud having a silver lining," and it may be so now on the Comstock; at least let us hope it will be so, and look for better times than ever before.

HECTOR.

Virginia City, Nev., Feb. 4, 1881.

Since writing the above I find, in the Virginia City Chronicle, the following item:

At 9 o'clock this morning, Thomas Gallagher started from Emmett's foundry, in Lower Gold Hill, with the big iron hub for the new balance wheel that is to be put up at the Yellow Jacket works. The casting weighs 21 tons, and is so large that it could not pass through the railroad tunnel at Gold Hill. Forty-two horses were required to haul the truck, on which it was placed, up the hill to the divide, when 22 of the horses were taken off. The casting was taken to the old railroad depot in this city, where it will be placed on a car and taken to the Jacket works. In order to get it through the Virginia tunnel it will be necessary to remove three sets of timbers from the south end.

The bringing of this casting from Gold Hill proved to be a greater undertaking than was expected. Everything went all right until the divide was reached, when one of the big wheels of the truck went through into a sewer, and it took three hours hard work with hydraulic jacks to get it out. The next point of interest was at the corner of Taylor and C St., where the turn for the down-hill grade to the depot was made. Here fully 500 men were congregated, each ready with a good plan for accomplishing the dangerous trip down the grade. When opposite the Chronicle office, one of the wheels again sank into a sewer, making another delay, and necessitating the employment of a great number of horses. A hack-action was hitched to the truck, loaded with pig iron. This was rough locked, and was intended as a drag or break to the truck.

THE ATCHISON, TOPEKA, AND SANTA FE.—W. B. Strong, Vice-President and General Manager of the Atchison, Topeka, and Santa Fe railroad, states that a connection will be made with the Southern Pacific road on or about March 15th, and that as soon after that as possible, through trains will be run between San Francisco and Kansas City. It is also understood that just as soon as the connection is made, work on the branch to Guaymas will be suspended from the east. The reason is said to be that there is no duty on rails and material landing at that port, and that rails can be shipped from Europe by way of Cape Horn at less than half what they cost in this country.

SLAG FOR FLUX.—The slag dump at the K K furnace, in South Eureka, has been purchased by Mr. Cy Horn, who is sorting it over for flux at the Atlas. The sorting is done to obtain the best of it, and the run of the Atlas furnace shows that the old K K did not do its work very well.—Eureka Sentinel.

### Tunneling in California.

The Isabelle Works, Alpine County. The cost of tunneling in this State, of course, varies very materially with the locality and with the tools used. It is not always, however, that we are able to obtain the exact figures. Through the courtesy of Mr. Lewis Chalmers, managing director of the Isabelle gold and silver mining company, Limited, an English company whose works are at Silver Mountain, Alpine county, in this State, we are enabled to publish the annual report of the company, which gives some interesting facts concerning the cost of tunneling. At this tunnel they cast their own car wheels, make their own pipes and have facilities for storing 50,000 lbs. of powder, as well as other supplies for the winter months. The report referred to is as follows:

MY LORD AND GENTLEMEN:—I have the honor to transmit herewith account of our receipts and disbursements for the bygone year, showing, under different heads, the cost of every department of the work, and also the cost per ft. of tunnel, which I am glad to say is, under my estimate, only \$26.16 instead of \$30. I have also the honor to present to you the following report:

For 11 months and 10 days, until I had your order to stop, the work has been steadily prosecuted, and we have run 2,958 ft. of 9x8 tunnel through hard rock. We drilled 10,283 1½-inch holes, 79,485 ft., blasted 12,424 times, extracted 26,192 tons of rock, and gained by each blast (594) 4 ft. 11 7-10 inches. To accomplish this we sharpened 5,619 drills. (For further particulars allow me to refer you to Appendix No. 1.)

Two No. 2 National Coy's drills of 3½ inch cylinder, driven by compressed air furnished by two of the same company's compressors (each 12 inch cylinder, 4½-inch stroke), at an average steam pressure of 75 lbs. and air pressure 90 lbs. did the drilling. One compressor was generally held in reserve in case of accident, although we occasionally encountered rock so hard as to necessitate the use of both.

The holes were charged with Vulcan powder, either No. 1 or 2 as the rock required, and exploded by a Laffin & Rand magneto battery, with fuses furnished by that company, both of which have given perfect satisfaction. I prefer Vulcan to any of the other high explosives.

Up to the beginning of March, much time was lost owing to the sickness of the miners caused by the deleterious fumes arising from the explosion of the nitro-glycerine compound used in the powder.

Since the introduction of the large Baker blower, the header has been supplied with an abundance of pure air, and we have no trouble from this cause.

To drive this slower, the lathe, drill, and circular saw, used for preparing timber and track material, a 40-horse power engine was added in August; which I purchased in San Francisco, at about half its original cost, and which is now as good as new.

As the tunnel progressed the pressure of water became insufficient to force the drill cuttings from the 8-ft. drill holes, but this was overcome by extending the water pipe about 1,000 ft. higher up the canyon, tapping the mountain stream at an elevation sufficient to ensure the requisite pressure (90 lbs. per square inch).

The trestle work crossing the creek has been extended 800 ft. to furnish dumping ground, with which we are now well provided.

As winter approached it became necessary to provide accommodation for 12 mules. I have therefore built a substantial stable, with grain and hay loft, of a capacity to hold six to eight months winter feed, and which are now full.

Thirteen new cars, carrying 5,000 lbs. each, have been added to the rolling stock. As we advance more will be necessary.

A commodious magazine capable of storing 50,000 lbs. of powder for winter use has been built of brick, in the side of the mountain, at a safe but convenient distance from the works, well drained and ventilated, arched with brick and covered with Portland cement. The winter supply is laid in. From the magazine a tramway delivers the powder to the thawing house thence to the tunnel. The thawing house is so constructed that, in cold weather, the powder can be quickly put in condition to do the greatest execution, the temperature being raised by steam conveyed by a pipe from one of the boilers.

A small building, occupied by the foreman as an office and sleeping room, has been erected near the tunnel mouth.

Finding it cheaper to buy our galvanized iron for our large air pipe, in San Francisco,—in consequence of the freight on made pipe being so high, and have it made at the works,—I engaged a tinner, and erected for the purpose a large building close to the tunnel mouth.

The engine room has been enlarged to receive the new engine, lathe, blower, circular saw and drilling machine, before referred to.

Car wheels became an expensive item, a set being cut through by the track iron from constant work in a very short time. Toward the close of the year, therefore, I built a cupola furnace, and make my own wheels. From three runs we had 47 car wheels and nine drill arms, at a cost not exceeding the freight on new castings from San Francisco. We re-cast the worn wheels and all the broken castings about the

works. A complete set of compressed brass valves were also cast and turned, worth, to buy, \$50 a set, and I propose to manufacture these various parts of the drills and other machinery which are constantly wearing out, also grate bars, and when required, shoes and diss, etc., for the mills; the only addition to the force being a molder.

At 2,750 ft. from the tunnel mouth we cut through a fissure, the foot wall of which was composed of a clay slip, in which were embodied detached fragments of quartz producing what are known as swelling ground, necessitating the frequent renewal and easing of the timbers and track which at this point are constantly shifting their position.

At the 3100 ft. the tunnel entered another ledge, running nearly at right angles with it; the foot wall marked by a narrow stratum of quartz, assaying \$30 per ton in gold. The ledge matter extends 120 ft. in width.

At the 3950 ft. we were almost inundated with water, which still continues to flow, but gives no trouble.

At the 4300 ft. we struck a ledge of quartz, clay and sulphurets, about four ft. wide assaying from \$4 to \$5 in gold.

At 4429 ft. we entered another body of similar material, which we were still in when the work was suspended.

Up to the time of my getting the diamond drill I had no money to expend on explorations at these points by drifting, which runs away with the tunnel funds; but as core holes with the diamond drill can be run at about \$1.50 per ft., I propose to run the drill at the following points: At the 1,250, 75 ft. farther north; at the 1,700, 200 ft. south; at the 1,950, 200 ft. south; at the 3,100, 75 ft. south; at the 3,250, 500 ft. north; and at the 4,300, 100 ft. south.

At all these points there are ledge indications, but cross formations running diagonally with the tunnel, impoverish and almost destroy them on the tunnel line. Cutting through these cross malformations, I expect to find them, or some of them, free, and therefore ore-producing.

To prove this theory, I directed the ground to be opened on top at the 1,250 ft. by two pits sunk on the line of the supposed ledge north from the destroying porphyry, one pit at 500 ft., and another at 600 ft. distant from said porphyry and in each pit found vein matter—making the presence of a ledge beyond dispute.

In 1879, a drift was started at the 1,250, to cut through this porphyry and run 200 ft. at right angles to the tunnel. When the diamond drill arrived, it was started at the face of this drift, and when work was suspended, it was penetrating the ledge.

None of the ledges I have mentioned are the Silver Mountain, the vertical of which, from a recent close personal survey and examination of the ground will not, I think, be reached under 5,320 ft., and assuming the dip to be west, or away from the tunnel mouth (as, contrary to my expectations, it has been in all the ledge formations we have cut), we may not reach the ledge itself till we get to the 3700. Here, also, we shall have to drift through another destroying formation, which, though it may not cut off entirely, will, in all probability, greatly impoverish it at this point. This drift may have to run 600 ft. at a cost of six dollars a foot, which will be amply repaid on reaching the ledge where free; but we may strike it free for a short distance after running only 200 ft.

This ledge is about 150 ft. in width, and carries its ore on both hanging and foot walls with a break or horse in the center about 60 ft. wide; a fact which is characteristic of this group of fissures.

About 150 ft. from the hanging wall we may expect to find the Sandy gulch, and from that to the 7200, the lodes of the company cover the ground. Of these the Adolphus and Pine Tree are the most important. The vertical of the I X L passes through the tunnel near 7680, and of the Exchequer, at 8000 or 8200, although because few of the ledges through which the tunnel passes carry their outcrops to the surface on the tunnel line, it is no easy matter to fix those points with certainty. Had it not been necessary to lay off the line between two fixed points so as to meet the requirements of the three companies, the tunnel could have been carried so much farther south as to run under the Isabelle ledge where they do crop up on the surface; but so laid off, the tunnel would have been much longer.

That you will find in all of these lodes, where free or undisturbed by more recent worthless formations, rich bonanzas, I have not the remotest doubt; and I say so with the utmost confidence when I call to mind that, with my own hand, I have taken ore from the Pine Tree, assaying from \$30.96 to \$69.70 per ton; from the Adolphus, specimens worth \$95.46 per ton; from the Exchequer, \$4,000 to \$5,000 per ton, and, that from the I X L croppings, over \$100,000 were milled in the old Pittsburgh & Davidson mills. It was from a spot only, comparatively speaking, that the millions of dollars were produced that rewarded the perseverance of the fortunate owners of the honanza mines on the Comstock. Here you have so many lodes, and so well defined on the top as well as where they have been opened at depth, and therefore so many chances. Your tunnel secures to you the mining and milling of your ores at so cheap a rate that success, I humbly submit, is placed beyond a peradventure. I have the honor to remain, my lord and gentlemen, your most obedient servant,

LEWIS CHALMERS,

Managing Director,

Silver Mountain, Cal., Jan. 22, 1881.

### California Petroleum

During the last year there has been a noteworthy general advance in the development of the California petroleum oil trade. In twelve months the daily production of crude oil in this State has been doubled. At the present time seven new wells, in addition to those which are already in operation, are in process of drilling, and there is every indication that by a similar date next year the yield will be twice as large as it is now. It is not unsafe to say that the trade in oil of home production has now reached a point from which it will not go backward, but will be enlarged and increased in the future with perhaps astonishing rapidity. It has long been known that this State included immense deposits of oil, and it has often been said that California would some time be the largest oil producing district in the world. The size and importance of this State as a source of oil in comparison with the Eastern oil fields in the United States is yet to be determined, but it is a fact that our oil trade has already acquired a start and headway which will be exceedingly difficult for any obstacle to check.

The business of drilling wells and producing the crude oil, which is the part of the enterprise which requires the largest amount of capital, is in strong hands which completely control it. It is sure of success, for behind it there is more than sufficient capital to sustain it, provide all the improved tools, methods and appliances by means of which it can be most advantageously prosecuted and hurried on with most celerity.

The energy of the capitalists who control this interest is as noticeable in the improvement which they have effected in the quality of refined oil as it is in their work at the wells. In the case of each new oil field which has been discovered in this country, it has taken years to learn how to properly refine its product. California crude oil is slightly different in its composition from the oils of other fields, but the refiners who have handled it have made better time in modifying their processes in this instance than refiners ever have made before. The difficulties of refining this oil are fast being overcome. During the last year a palpable advance in this direction has been made, and we have assurances that the results just obtained from a long series of experiments, analyses and tests, made in conjunction with the regular work of refining, are most satisfactory.

One of the most important parts of the machinery for carrying on the trade has been greatly improved this year. This is the substitution of barrels for the cans and cases in which, up to the present time, nearly all refined oil has been packed. The barrels, which have reversible faucets, effect a saving of about three cents per gallon in the packing of oil, or \$120,000 on the whole quantity of oil packed and consumed on this coast during the year. The consumption on this coast during the year was 4,000,000 gallons.

Nine-tenths of all the oil used in the world today is the grade standard white, 110 deg. fire-test. The trade in California oil monopolizes the sale of this grade on the coast, and there is a surplus of it now in San Francisco. It supplies nearly all the western coast of Mexico, and is seeking the trade of the East Indies. Over and above supplying the demand in our own State, it has crept into the surrounding territories, and is pressing eastward toward the markets supplied by Eastern oil. Negotiations have already been made for large shipments to Japan and China, and this is spoken of as making an important stage in the development of the trade. The Asiatic trade is most coveted. Among the commercial men who have heard of these coming shipments there is a feeling of interest and appreciation, founded upon the widest fact, that the latter will tend to promote activity in other trades between this coast and these countries by providing increased shipping facilities. The prices here during the last six months have ruled only a trifle higher than the prices in New York. When San Francisco competes with New York for the Asiatic and East India markets, San Francisco is much the more desirable point to ship from, because the great difference in distance insures much to our benefit.

CALIFORNIANS AND NEVADIANS WANTED.—From a letter from Tombstone, Arizona, to the Candelaria True Fissure, we take the following paragraph: Nearly all of the mines here are controlled by Eastern men and Eastern capital. This is really a great detriment to the district, for there is more life and "git up and git" to one man from Nevada than there is in ten of these tenderfeet. This camp contains about 5,000 people; there are two daily papers and another will be issued in a few days. The best of board can be had here for eight dollars a week. There is much competition in all kinds of business, but everything is much cheaper than in Nevada. I would not advise any of the boys to come here for work. Everything in that line is greatly overdone. There are from three to five hundred idle men here; but it is no worse than other camps of its size elsewhere. Many of the boys from your locality are here. Some are working for wages and some are prospecting.

A SECTION of several hundred feet of the Dardanelles mining company's ditch, Placer county, slid away the other day, destroying some small reservoir in its course and necessitating the building of a flume for the conduct of the water.

THE Harshaw group of mines, in the Harshaw mining district, have been purchased by Dan Gillette and associates, of San Francisco, for \$200,000, and work on them will be at once commenced, under the personal supervision of Dan Gillette.



## MECHANICAL PROGRESS.

## Compound Portable Engines.

English manufacturers of agricultural machinery are devoting considerable attention to compound portable engines. At the recent Smithfield Club show three engines were exhibited, among others being one by Messrs. Garrett & Sons, of Leiston, of which *Engineering* gives the following details: The engine is of the intermediate receiver type, with cranks at right angles, and the cylinders, which are net steam jacketed, are respectively 7½ and 11½ inches in diameter, the stroke in both cases being 10 inches. The engine is rated by its makers as a 10-horse. The steam pressure used is 100 lbs. per square inch, and we are informed by Messrs. Garrett, that during a series of recent trials on the brake, the engine worked with as low a consumption as 22.8 lbs. of water per brake horse-power per hour, the load on the brake being at the time equal to 29-horse power, and the engine making 178 revolutions per minute. This trial lasted 2 hours, 4 minutes, and the consumption of Llangennech coal was at the rate of 3.17 lbs. per horse power per hour, the evaporation being 7.2 lbs. of water per lb. of coal, from a temperature of 110°.

This is a very excellent performance as far as the consumption of water is concerned, but the evaporative duty of the boiler is open to improvement. The engine has the valve chests on the outer side of the cylinders, and the slide valves are of the Trick pattern, giving a double-ported admission to the steam. For facilitating the starting of the engine, Messrs. Garrett have introduced the arrangement of stop valve. When in its extreme position to the right, the valve admits steam to the high-pressure cylinder, and places the exhaust of that cylinder in connection with the valve chest of the low-pressure cylinder. In its mid-position the valve partly throttles the steam admission to the high-pressure cylinder, but at the same time allows live steam to pass to the low-pressure cylinder, while the exhaust of the high-pressure cylinder, in place of passing to the low-pressure valve chest, passes to the low-pressure exhaust. In the extreme left-hand position the valve shuts off the steam from both cylinders.

**A NEW MATERIAL FOR RAILROAD BALLASTING.**—A new feature in railroad building has been started by the Chicago, Burlington & Quincy, in the manufacture of a new material for ballasting. It is formed of clay subjected to heat by bituminous coal. A small fire of bituminous Iowa coal is started on the surface of the ground, and when burning freely the fire is covered with a layer of lumpy clay, then alternately coal and clay, the coal decreasing in quantity until at the top it is as 1 to 15. The mass is formed like a cone. The clay appears to be impregnated with carbon, as it burns with a dull flame. Already three of these cones have been started near Red Oak, each 18 ft. high, the base of each touching the other. It is proposed to form them into one cone of large proportions, and let them burn all winter. The quantity of material in them is about 1,000 cubic yards. When cooled it is broken up and used for ballast. The manufacturers have a contract to ballast 600 miles of road with this material. When cold it resembles coal cinder, but it is much harder and of a reddish color. The process of manufacture is an English invention, which has recently been patented in this country.

**RAW HIDE COG WHEELS.**—A Wurdensburg inventor has recently exhibited some toothed gear wheels made of leather instead of metal, the advantages claimed for them being that they have a much quieter and more elastic run, are extremely durable and require no lubrication whatever. These gear wheels are prepared from raw buffalo hides, thoroughly cleaned from all hair, flesh, etc., and glued together in as many layers as are necessary to produce the breadth of wheel required. The cementing is, of course, effected under very heavy pressure, as in a hydraulic press, this being kept up until the glue has completely hardened. From the sheets or plates prepared according to the method described, the teeth are cut out, of uniform size and pattern, by saw and chisel.—*Exchange.*

**TESTS OF BOILER PLATE.**—It is now our intention to give, with our next number, if the engravings are finished, the result of a test which has never before been made in this country, relating to different tests of iron which have been in use. It will be complete and exhaustive, as well as furnishing some pretty hard arguments for the theoretical men who "oan tell all about iron by looking at it or thumping it with a hammer." Several more articles of this kind are now in course of preparation, which we shall publish first from the report furnished.

**REMARKABLE CASTING.**—The most novel exhibit shown at the Brussels National exhibition by the Serravallo Works is a certainly remarkable casting. It consists of what is practically the whole cast iron work of a marine engine, with a pair of cylinders about 28 inches in diameter by 20 inches stroke, cast in one piece—head plate, condenser, air, and feed, and bilge pumps, standards, cylinders and exhaust pipe.

## American Locomotives.

The United States exported 25 locomotives during the fiscal year of 1870, and 60 during the year 1880—an increase of 140%. Several monster locomotives for freight service are in process of construction for the New York, Pennsylvania and Ohio railroad. They rest on six drivers and a four-wheeled truck, and will weigh 38 tons, empty. Train men are considerably troubled by these trains breaking in two when hauled by these powerful consolidated engines, and the only remedy seems to be in equipping freight cars with heaviest drawbars, shackles, and pins.

The following from Mr. R. M. Broton, C. E., may be quoted as an authoritative English opinion of American built locomotives: "I argue that the greater duty done by the American motor is due to the better design and the better system of working the locomotives. The American builder excels in the system of framing and counterbalancing, and in the designs of crank axles, etc., so that the engine may run remarkably easy and without jar, round sharp curves, and work not only on the light roads, but also diminish the wear and tear on the solid roads, and at the same time increase the effective tractive force. The English engine is a very heavy affair, and in running it not only wears and tears itself very rapidly, but also the roadway, and it greatly, by its unsteadiness and jar, fatigues the drivers and firemen. I have ridden hundreds of miles on engines in India, in England, in France, and in the United States, and I have always found the American engine most easy and comfortable, but I never did the English or the Continental engines. It is almost impossible to give these engines their full hauling power, simply because the greater portion of the weight cannot be thrown off the driving wheels."

## Hose Pipe Nozzles.

Who is going to invent the nozzle of the future? There is no nozzle that we have ever seen that seems to us to control the stream it delivers as it should do. Instead of projecting a solid stream for a long distance, the water breaks soon after leaving the nozzle, and soon sprays and breaks up altogether. We often hear of steamers throwing 250 and 300 ft., but we recently heard a veteran chief say that he had yet to see the apparatus of any kind that would throw a solid stream 100 ft. The difficulty may be all with the water, which is naturally inclined to separate, but we are of the opinion that part of the trouble lies in the construction of the nozzle. An experiment made at Boston by putting a core into a play pipe, and thus dividing the stream into four parts, depriving it of its rotary motion, showed a gain of 30 ft. in distance playing. But even this does not seem sufficient. Our steamers give us power enough for throwing, and the hose in use gives every facility for carrying a large volume of water. There should be some means devised for delivering that volume in a solid stream at long distances. Great difficulty has been found in making nozzles operate uniformly at all times. A manufacturer of steamers once found a nozzle that gave him great satisfaction; with it his steamers could throw greater distances than any he had ever tried before. He ordered half a dozen just like it. The half a dozen were made precisely like the first, but never equalled it in delivering water. There is much to be learned yet regarding this question of delivering water on fire, and the exact relation existing between pressure, hose, play pipes, nozzles and the friction of water.—*Fireman's Journal.*

**HONORS TO SIR HENRY BESSEMER.**—The freedom of the city of London was lately conferred on Sir Henry Bessemer, F. R. S., at a special Court of Common Council. In acknowledging the honor thus conferred on him, Sir Henry Bessemer referred to the condition of the steel manufacture before the introduction of his process, and the rapid development of the industry which that process had caused. He compared the total steel production of the country, which did not exceed 51,000 tons a year, to the present output of nearly a million tons, and the reduction of price from £50 to £10 a ton. The document conveying freedom of the city was presented to Sir Henry Bessemer in a gold casket of very excellent design, appropriately illustrating his process. This casket was the production of Mr. J. W. Benson, of Ludgate Hill.

**A NEW METHOD OF PRESERVING WOOD.**—An improved French method of preserving wood by the application of lime is said to be found to work well. The plan is to pile the planks in a tank and to put over all a layer of quicklime, which is gradually slacked with water. Timber for mine requires about a week to be thoroughly impregnated, and other wood more or less time, according to its thickness. The material acquires remarkable consistence and hardness, it is stated, on being subjected to this simple process, and the assertion is made that it will never rot. Beechwood prepared in this way for hammer and other tools for iron works is found to acquire the hardness of oak, without parting with any of its well-known elasticity or toughness, and it also lasts longer.

## SCIENTIFIC PROGRESS.

## A New Theory of the Constitution of the Sun.

Some recent studies of solar spectra in connection with sun spots and other features of the sun's envelope have led Mr. Charles S. Hastings, of the Johns Hopkins University, to form a somewhat novel theory of the sun's constitution and the conditions producing the more notable phenomena familiar to solar students.

Mr. Hastings finds, contrary to the received opinion, that the spectra of the center and the outer edge of the sun's disk are not precisely alike, though the differences are so minute as to escape all but the most perfect instruments and all methods which do not place them in close juxtaposition. Certain of the Fraunhofer lines, thickest and darkest in the spectrum, notably those of hydrogen, magnesium and sodium, which appear with a haze on either side in the spectrum of the center of the solar disk, are sharp and distinct in the spectrum of the limb. Certain very fine lines are stronger at the limb, while other very fine lines are stronger at the center. The ordinarily accepted theory of the solar constitution and the origin of the Fraunhofer lines fails to explain these phenomena.

The probable reasons for this failure Mr. Hastings discusses at considerable length in the January issue of the *American Journal of Science*, and then proceeds to frame a theory of the sun's constitution, which, he thinks, will satisfactorily explain all the observed phenomena, and which may be briefly summarized as follows:

His theory differs from that of Faye chiefly in localizing the phenomena of precipitation instead of regarding it as proper to all portions of the photosphere, and in supposing the precipitation confined to one or two elements. He attributes the granular appearance of the solar surface to ascending currents directed generally from the center of the sun. About these currents are necessarily currents in an opposite direction, which serve to maintain a general equilibrium in the distribution of mass. The ascending currents start from a level where the temperature is probably above the vaporizing temperature of every substance. As they move upward the vapors are cooled, mainly by expansion, until a certain element (probably the carbon group) is precipitated. This precipitation, restricted from the nature of the action, forms the granules. The precipitated material rapidly cools, on account of its great radiating power, and forms a fog or smoke, which settles through the spaces between the granules till revolvatized below. It is this smoke which produces the general absorption at the sun's limb, and the "rice grain" structure of the photosphere. The reasons for supposing the precipitated element to be of the carbon group (carbon or silicon) is simply that no other substances present the properties indicated by the cloud masses of the photosphere. It is pretty clear that the substance has a boiling point above that of iron, for iron vapor at a lower temperature exists in its immediate neighborhood. The element is not a rare one, and its molecular weight cannot be great, for though precipitated below the upper natural limit of its vapor there are few elements found in abundance above it, and those in general of low vapor density. It is possible that the light coming from the sun is radiated from solid or liquid particles of carbon just at the point of vaporization; but Mr. Hastings is rather inclined to suspect that the photospheric material is silicon. There is also good reason to suppose he thinks, that carbon is precipitated at a higher level, possibly along with the less common element boron.

The clouds of carbon or other smoke would naturally be drifted into spaces of downward flowing currents, thus forming sun spots, the characteristics of which are readily accounted for by the necessary behavior of smoke clouds sinking into regions of higher temperature. This explanation of sun spots and their allied phenomena is certainly plausible, and we shall look with interest for what older students of the sun shall have to say about it.

**CHEMISTRY OF PLANTS.**—Dr. S. Ringer, who has for some time past been experimenting upon the physiological action of *Narcissus*, *Galanthus*, *Hemanthus*—genera belonging to the natural order *Amaryllidaceae*—has recently examined the properties of an alkaloid from the common garden tulip—a *Lilaceae* plant, and communicated his results to the *Practitioner*. It has been found by him that nitrate of tulipine differs almost entirely from the alkaloids derived from the amaryllids, it being a muscle poison which affects the muscles like veratrin, but to a less degree. These results are interesting from a botanical as well as a physiological standpoint, as going to confirm the theory that the relationships between natural orders may, to a certain extent, be indicated by the nature of their chemical constituents. The nearer relationship of the *Lilaceae* to the *Melanthaceae* seems shadowed forth by the fact that a *Lilaceae* plant has yielded an alkaloid like veratrin. In the same manner the position of the Australian genus *Duboisia*, as belonging to the *Solanaceae* rather than to the *Scrophulariaceae*, was demonstrated by the elimination of the alkaloid duboisine, and the discovery that its physiological action was analogous to that of solanaceous alkaloids.

## The Color Relation of Metals.

In a paper on the color relation of metals, and notably on those of copper, nickel, cobalt, iron, manganese and chromium, lately read before the Chemical Society, Mr. T. Bayley records some remarkable relations between solutions of these metals. It appears that iron, cobalt and copper form a natural color group, for, if solutions of their sulphates are mixed together in the proportions of twenty parts of copper, seven of iron and six of cobalt, the resulting liquid is free from color, but is gray and partially opaque. It follows from this that a mixture of any two of these elements is complementary to the third, if the above portions are maintained. Thus, a solution of cobalt (pink) is complementary to a mixture of iron and copper (bluish green), a solution of iron (yellow) to a mixture of copper and cobalt (violet), and a solution of copper (blue) to a mixture of iron and cobalt (red). But, as Mr. Bayley shows, a solution of copper is exactly complementary to the red reflection from copper, and a polished plate of this metal, viewed through a solution of copper salt of a certain thickness, is silver white. As a further consequence, it follows that a mixture of iron (seven parts) and cobalt (six parts) is identical in color with a plate of copper. The resemblance is so striking that a silver or platinum vessel covered to the proper depth with such a solution is indistinguishable from copper. There is a curious fact regarding nickel also worthy of attention. This metal forms solutions which can be exactly simulated by a mixture of iron and copper solutions; but this mixture contains more iron than that which is complementary to cobalt. Nickel solutions are almost complementary to cobalt solutions, but they transmit an excess of yellow light. Now, the atomic weight of nickel is very nearly the mean of the atomic weight of iron or copper, but it is a little lower—that is, nearer to iron. There is thus a perfect analogy between the atomic weights and the color properties in this case. This analogy is even more general, for Mr. Bayley states that in the case of iron, cobalt and copper, the mean wave length of the light absorbed is proportional to the atomic weight. The specific chromatic power of the metals varies, being least for copper. The specific chromatic power increases with the affinity of the metal for oxygen. Chromium forms three kinds of salts—pink salts, identical in color with the cobalt salts; blue salts, identical in color with copper salts; and green salts, complementary to the red salts. Manganese, in like manner, forms more than one kind of salt. The red salts of manganese are identical in color with the cobalt salts and with the red chromium salts. The salts of chromium and manganese, according to the author, are with difficulty attainable in a state of chromatic purity. He thinks these properties of the metals lead up to some very interesting considerations.

**THE ORIGIN OF THE DIAMOND.**—M. J. A. Roorda Smit has in the *Archives Néerlandaises des Sciences Exactes* a paper on the diamond mines of South Africa. He states that the diamond is found in a primitive gangue of volcanic origin, the presence of a double carboniferous silicate being a characteristic of these mines, which he regards as extinct craters of volcanoes. His hypothesis is that the diamond is of Plutonic origin formed at the expense of organic matter under the influence of great pressure, and at a high temperature. The recent artificial production of the diamond appears to confirm this view. M. Meunier states in the *Comptes Rendus* that he has produced crystals of spinel, and he believes periclase and corundum, by the action of steam on the chloride of aluminium in presence of magnesium at a red heat.

**PHOTOGRAPHING THE CHROMOSPHERE.**—Janssen has been induced, by his late novel experiments, to undertake photographs of the chromosphere. He allows the solar luminous action to continue so long that the solar image becomes positive to the very circumference, without going beyond it. The chromosphere is then shown in the form of a dark ring, with the thickness of 8" or 10". He has compared positive and negative solar photographs, which were obtained on the same day and with the same instrument; the measurement of the diameters shows that the dark ring in question is wholly outside of the solar disk.—*Comptes Rendus.*

**MACHINERY FOR WASHING AND SCOURING WOOL.**—This is an invention of combination of mechanism for dragging the wool from the washing contrivance up the incline to the squeezing rollers. One of the modifications consists of two sets of frames rammed with teeth, the rays of the teeth in one frame alternating with the rays of the teeth in the other frame, while another modification makes use of only one frame to drag up the wool, the other frame having a lifting movement to retain the wool. The frames are similar to a harrow in construction.

**MALLEABLE CAST-IRON.**—According to Mr. L. Forquignon, malleable cast-iron appears as an intermediate body between steel and gray pig-iron, from which it differs by the special nature of its amorphous graphite and by its great tenacity. It is distinguishable from steel by its slight extensibility and its large proportion of graphite.







at Panamint making arrangements for extensive work. A party well acquainted with matters there predicts that the Panamint will soon arise to something near its former glory and importance.

**FROM GOLD MOUNTAIN.**—Supt. I. M. Taylor, of the celebrated State Line mine, at Gold Mountain, lately spent several days in town. While here he purchased 4 miles of 4-inch water pipes and some 10 tons of grain, and also contracted with Sheriff Smith for 40,000 ft of lumber, or as much more as he can deliver.

## MARIPOSA.

**STRUCK IT.**—*Mariposa Gazette*, Feb. 5: We are reliably informed that James Dolan, who has charge of the Games vein, or Mexican mine, as it is called, some 4 or 5 miles above Hite's mine, has recently struck a 2-ft vein in the tunnel, which is said to be good and is exciting considerable interest. This mine belongs to Mr. Robert Williams, of this place, and it is banded to a company of New York capitalists. Mr. Williams has hattered away at this mine for several years, and spent considerable money in attempting to develop it. Our informant says: "This strike of a 2-ft ledge is the best thing that has happened to the county for years." Informant further says that the Ferguson mine is looking better than ever before, and is going to pay dividends from the start.

## MONO.

**BOULE.**—*Free Press*, Feb. 1: One hundred and twenty-four stamps are now thundering away on ore, and the new (Spaulding) mill will start up on Wednesday or Thursday next, the storm having delayed work. At least 90 more stamps could be readily supplied with good mill-ore. The Lent (Bodie and Mono Combination) shaft is down 415 ft, and is being sunk at the rate of fully 30 ft a week, which will send it 80 ft below the water level, and probably into the Fortuna vein of the Bodie and Mono mines by the end of next month. Several tons of machinery for this shaft was shipped from Carson on the 20th inst. The pump column and the 200 ft shaft are being lowered to the Cloud shaft. South Bulwer is still sinking. It is expected that Champion will begin sinking below the 580 level on Thursday next. Owing to the rich development in the winze from the 512 level of Noonday, it is in contemplation to begin the work of sinking the North Noonday-Noonday combination shaft at an early day. Boston Con. is cleaning out its sump preparatory to sinking to the 512 level to test, at that depth, the valuable vein followed for a distance of 310 ft in the 300 level. Syndicate is stopping an ample supply of ore for its 20-stamp mill from the old Geocela vein. Bodie tunnel is drifting north in flum ore in the Festoon (No. 20) vein, and will ship 100 tons to the Miners' mill next week, the object being to make a practical test of the ore before ordering a mill. Union Con. has cut through vein No. 2, which proves to be 12 ft wide, and gives assays averaging \$77.54 to the ton. The ore is of the Goodnow type. Goodnow is the winze from the 400, is milling much higher than was expected, and hence stoppage at that point has been resumed, having been temporarily suspended with the design of taking a better quality of ore from the south drift. The average pulp assays from Standard ore made an astonishing advance last week, running up to \$40.76, as against \$34.53 for the week ending Jan. 23d—an increase of \$15.13. The west crosscut, 1000 level, of Standard is in place, 37 ft, in rock of favorable appearance. The west crosscut, 982 level, of Tioja is in 75 ft, the increase in the flow of water from the face indicating the close proximity of the ledge. Bodie is quietly but steadily coming to the front again as the richest gold mine in the world, the quality of the ore extracted having steadily increased for the past 3 weeks. The yield of the ore milled last week was \$115 per ton, the average of pulp assays being \$54.50, and the difference between this and \$115, or \$60.44 per ton, being coarse gold saved in the batteries. As most of the ore milled is taken from the 0th or lower level, this showing is a most splendid one for the future of the mine. Concordia continues famously rich. The ore in the winze from the 512 level of Noonday gives assays up in the hundreds, and all the stops in Noonday and North Noonday are looking well. A wrong impression having gone out that many stops in this connection, that both the Noondays and the Concordia are entirely free from litigation, present or prospective, affecting the integrity of their respective surface claims or ore developments.

## NEVADA.

**THE HIRSCHMAN CLAIM.**—*Tri-Weekly Herald*, Feb. 5: We learn that J. W. Seibert, of New York, who last winter purchased the Hirschman gold diggings, which were sold lately at Sheriff's sale to satisfy a mortgage thereon, has arrived in San Francisco from the East, and will shortly visit this city and redeem said mortgage. Should he do so, work at the mine will soon be commenced.

**THE MICHEL PAN.**—*The Boston & Montana G. M. Co.*, of Helena, Montana, have purchased of J. Michel, of this city, one of his amalgamating pans.

**THE THOMAS MINE.**—The Thomas mine has been commenced to suspend operations on account of the want of fuel. The pumps were taken out a few days ago. The company will probably not open up again before spring.

**THE DERBEC MINE.**—*Nevada Transcript*, Feb. 4: Supt. De Nonn came down in a private conveyance yesterday morning with the last clean-up at the Derbec mine, which is said to have been a good one. It is reported he will be here to arrange for sinking an incline through which to work the mine hereafter. The work is now being done through a perpendicular shaft and is very expensive. The management are of the opinion that the incline would enable the production of a sufficiently large amount of pay dirt to make dividends possible at an early date.

**ALASKA.**—*Grass Valley Union*, Feb. 8: There is too much surface water at the Alaska mine, and work has been stopped. No time has been set for resuming operations.

**SEBASTOPOL.**—The Sebastopol shaft has filled with water, and no effort will be made to pump it out until it is certain that the worst of the rainy season is over. Just before shutting down the water raised in the shaft from 60 to 70 ft in a few hours, supposed to be the seepage from the old workings of the Redan mine, as the pump was considered to have capacity to take all of the surface water.

**CENTENNIAL.**—The Centennial mine has now 2 6-inch pumps at work, which are holding the water below the 300 level, and unless there should be a renewal of the heavy rains, work can be continued in the upper levels of the mine without interruption, and in due time the mine will be drained to the bottom.

The hauling of quartz to the custom mills has been entirely suspended, as the roads are so soft and deep in mud that hauling would be attended with too much labor and expense to justify the effort.

**ALPHA MINE.**—The little Alpha quartz mine has been having another good run, having cleaned up last week 130 ounces of amalgam as the product of the labor of 3 men and 2 boys for 3 weeks; the amalgam, when retorted, being worth the value of \$100. The product, load was about \$27.75. The mine continues to show the vein, which is about 2 ft in width, showing well in free gold and sulphurates. The level from which this rock was taken is the first, 120 ft in depth. It is the intention to sink for a new level after the rainy season is over. There has been no difficulty experienced thus far from surface water, which has been a source of trouble and detention to several mines in the district.

**IDAHO PRODUCT AND DIVIDEND.**—The bullion product of the Idaho mine for the month of January was \$66,000. The February dividend has been declared, payable immediately, of \$7.50 per share, amounting to \$23,550. This is the largest monthly product and dividend given by the mine in several years.

## PLUMAS.

**THE MONTE CRISTO.**—*Plumas Sentinel*, Feb. 5: Work is going on in good shape at this somewhat famous mine, and every day shows the gravel bed more plainly. A shaft recently put down from 1 of the drifts has passed through 3 ft of blue gravel, and still is not on bedrock. The main vein has encountered some heavy boulders, but with the aid of the big drill they are rapidly blown out of the way, and good progress is being made.

## SIERRA.

**SUSPENDED WORK.**—*Mountain Messenger*, Feb. 5: The Eureka Con. gravel company, Sierra City, has suspended work until spring, being unable to supply the mine through the deep snow, with provisions.

**SNOW 3 FT DEEP.**—Eureka. The miners have abundance of water, and are busy in their claims.

## NEVADA.

### WASHOE DISTRICT.

**C. & C. SHART.**—*Vincilia City Enterprise*, Feb. 6: The pump at the 2400 level is running and has been connected with the sinking pump at the bottom of the shaft.

**UNION SHAFT.**—The shaft has been sunk 10 ft during the week; placing bob in position at the 2300 level.

**UTAH.**—Since last report the east drift on the 1050 level has been advanced 26 ft, and the east drift on the 2150 level 25 ft; total length, 245 ft.

**MEXICAN.**—On the 2500 level the joint Ophir winze has been sunk and timbered 17 ft.

**ADAMS.**—During the past week the shaft has been sunk and timbered 30 ft; total depth below the 1550 level, 155 ft. The rock is growing harder. The shaft has been passing through ledge matter for the past 140 ft, carrying considerable base metal and giving low assays.

**UNION CON.**—Drill hole No. 9, from the bottom of winze No. 1, was extended 120 ft, the drillings assaying from a trace to \$15.

**CON. VIRGINIA.**—During the past week 102 tons of ore have been extracted and sent to the mill; assay value, \$15.53. Bullion in the office, \$10,308.32. On the 2300 level the south lateral drift has been extended 10 ft, the joint California east crosscut 17 ft, and west crosscut No. 1 6 ft.

**OPHIR.**—On the 2300 level the joint California winze has been sunk and timbered 17 ft. During the week, bullion to the value of \$5,175.02 has been shipped.

**ADAMS.**—On the 2300 level the shaft has been advanced 20 ft; total, 520 ft. On the 2500 level the north drift has been advanced 50 ft; total, 490 ft. The south drift on the 2400 and 2500 levels has been advanced 34 ft; total distance south of the winze, 103 ft. Ore raised during the week, 42 tons and 1,400 lbs, assaying from \$17 to \$60 per ton.

**CALIFORNIA.**—During the past week 153 tons of ore have been extracted and sent to the mill; assay value, \$13.53; bullion in the office, \$34,036.21. On the 2300 level the joint Ophir east winze has been sunk 17 ft, and the joint east Con. Virginia crosscut the same distance.

**SUTRO TUNNEL.**—Report of weekly progress of the Suto tunnel, ending Feb. 1, 1881: Main Tunnel—A shaft of timbermen was employed a portion of the week re-timbering near the Combination connection. The usual force was employed on general repairs along the main line. Flow of water in standard gallons, 3,351,000. North Lateral—The usual repairs were made to keep the drift in good order. South Lateral—Total number of ft from Julia connection 2,661. Nature of ground, heavy and swelling. Nature of rock, andesite with frequent clay seams. The nature of the ground run through during the last month proved to be of the worst character, and it was found impossible to keep the ground open with the ordinary method of timbering. On Jan. 25th work was discontinued at the header, and all the forces were employed in re-timbering, casing timbers and repairing the drift near the face. The ground is excavated 3 ft on the top and sides of the timbers, and false sets 10x12 inches put in. A portion of the bad ground has been re-timbered in this manner, and the new sets stand the pressure well. Other repairs were also made along the drift. At present some hot water is running from the face.

**YELLOW JACKET.**—During the past week we have extended the Suto tunnel level drift 50 ft, making the present length of the same 234 ft from the switch. The ground in this drift continues dry and full of clay seams, making it necessary to timber the drift and keep the same close to the face. During the first part of the week we were obliged to hoist water with our tanks for 70 hours, to assist the Belcher company to recover their 2160 level sump. On the 10th inst. received the center piece of one of the new flywheels, and are now employed getting the same into the building.

**A SINK HOLE IN THE COMBINATION.**—*Gold Hill News*, Feb. 5: Supt. Bawden reports that since Jan. 1st the water in the Julia incline has settled away 6 ft, and is now 02 ft below the point to which it originally raised. The decrease has taken away not only the water struck in Julia, but what was struck in the Bullion Combination shaft above the 1800 level, the flow of which was quite strong.

### CHERRY CREEK DISTRICT.

**MILL.**—*White Pine News*, Feb. 3: The Tipup mill building is up, and the machinery will be placed in position as fast as it arrives from the railroad.

**MR. MOSE SCRAMBLIN**, one of the best-known millmen in the district, and for several years in charge of the Star mill at this place, has severed his connection with that company.

The town for the past week has been quite dull, most of the idle men having gone into the hills at various occupations.

**BULLION SHIPMENTS.**—The Star company made the following bullion shipments, through Wells, Fargo & Co., during the past week: Jan. 28th, 2 bars, valued at \$1,350; Feb. 1st, 3 bars, valued at \$2,050; Feb. 3d, 2 bars, valued at \$1,300; total, \$4,700. The Exchange company shipped during the same period 2 bars, valued at \$3,000.

### EUREKA DISTRICT.

**THE GETTLOOF.**—*Sentinel*, Jan. 4: The general aspect of our mining business throughout the district never looked so prosperous and generally encouraging as at present. We do not expect a "boom," but we do look for very prosperous times here this spring and summer.

**CARSON CO.**—Work was commenced in the mine yesterday and will be prosecuted steadily. It consists of 4 claims on the west side of Cariboo hill, owned by Luther Clark and G. L. Scott. Small seams of ore running into the hundreds have been found on the property, and the owners naturally believe that better exist.

**THE MARYLAND TUNNEL.**—Work on the tunnel has been temporarily suspended, the management believing it good policy to await the development in some of the adjacent property. In the meantime they are prospecting some of their numerous claims.

**BAY STATE.**—Supt. Tom Robinson, of the Bay State, arrived from Newark valley yesterday. He reports that the machinery will soon be in position, and active operations resumed in the mine.

**THE BULLWHACKER.**—An average of 5 tons of ore are shipped from this mine to the reduction works daily. The amount would be larger but for the fact that 200 ft of the incline filled by chlorides is being cleaned out.

**EL DORADO.**—McDonald & Co. are prosecuting work on the above named mine with good success, and are taking out ore assaying as high as \$200 per ton. It is possible that the series of mines belonging to the gentlemen interested in this claim will change hands shortly.

**HAMBURG.**—No work will be done on the Hamburg before April 1st, when Supt. Powell anticipates that operations will be resumed. The Hamburg is considered to be an excellent property, and it should be thoroughly developed.

**A REDUCTION.**—Ten contracts have been closed in the Richmond mine, throwing 60 men temporarily out of employment. This course was necessary on account of the fact that the furnace on hand, the furnaces being unable to consume the supply.

**A FULL RUN.**—*Sentinel*, Feb. 5: Last week over 150 tons of ore were smelted at the reduction works of the Ruby-Dunderberg, and the furnace was kept running the entire week. There is no diminution to the ore output of the company's mine, a fact that will give satisfaction to those interested in the success of the camp.

### ESMERALDA DISTRICT.

**DEL MONTE.**—*Herald*, Feb. 5: After two weeks steady pumping and tanking, the heavy flow of water encountered in the excavation for tank station on 875 level has so far subsided that the pump now handles it without difficulty. Work was resumed in the excavation last night, and, as soon as the tank is put in, the plunger pump will

be placed in position at that point. During the past week the station on 800 level has been cut out and timbered, and the drift on that level is being pushed forward as rapidly as possible.

### GRANTSVILLE DISTRICT.

**CENTENNIAL.**—*Bonanza*, Feb. 5: Work is progressing as usual in the Centennial mine. The shaft has attained a depth of 45 ft, the bottom being in line looking ore. It is confidently expected that this property will develop into one of the finest in the district, and furnish sufficient ore this summer to justify the erection of a 20-stamp mill.

**THE ALEXANDER.**—The stopes in the Alexander mine are improving every day, and the whole mine is rapidly developing into one of the greatest wonders in the mining world.

**THE BROOKLYN.**—The late rich discovery in the Brooklyn continues to show more and better ore every day, with no signs of approach to the back of the ledge.

### LEWIS DISTRICT.

**RENNISS.**—*Cor. Silver State*, Feb. 4: The Starr & Groves mine and mill, at this place, are running pretty steadily and doing well, yet there is a gloom in the camp, and a dark cloud seems hovering over the Starr & Groves company, which some months ago took charge of the Starr & Groves property, reduced wages, and the reduction took effect today. Mill hands and miners' wages were reduced to \$3 per day, and \$8 a week for board. The wages of outdoor laborers were cut down to \$2.50 per day. There seems to be a disposition among the miners and others not to work at the reduced wages, and I am of the opinion that work will be suspended today. It certainly looks as if there will be a strike on account of the reduction, and if there is, the workmen will endeavor to prevent new comers from taking their places at the reduced wages. It is hoped that a compromise will be effected between the managers of the mine and the miners, and that their differences will be amicably settled.

### PIOCHE DISTRICT.

**R. & E. SHART.**—*Pioche Record*, Samuel Stoddard has been investigating the alleged caving of the main shaft of the Raymond & Ely mine, and found that no such cave had taken place near the main shaft, but between the 3d and 4th levels, 160 ft from the main shaft, a slight caving had taken place, which will require but little trouble to fix up.

**ATTACHMENT SUIT.**—An attachment suit was commenced against the Bristol mining company, on the 23rd of January, for \$13,377, by which all of the company's property was levied upon. We understand that the matter will be shortly arranged to the satisfaction of all concerned.

The chlorides working in the different mines around Pioche have a large quantity of ore on hand, and are only waiting for the export steamer to get to ship. Several others have been unfortunate in shipping to Dry Valley, as their ore has laid on the side-track, near the mill, ever since ice formed. The latter are waiting for a thaw.

### SPRING VALLEY DISTRICT.

**DEVELOPING.**—*Eureka Sentinel*, Feb. 3: Messrs. E. R. Rose and George Burgess are now developing the Woodchopper and performing assessment work on the Rose, Five-Twenty and Robinson. In the Woodchopper a body of high-grade ore has been uncovered, and when spring opens the mine is to be thoroughly prospected. In the Five-Twenty a quantity of ore was taken from a shaft short distance from the Woodchopper, and shipped to Austin, that yielded \$1,800 per ton. With such a record in the past, the present owners of the mine, Messrs. Duker, Rose and others, naturally believe there is a future for the camp.

### ARIZONA.

**GLOBE DISTRICT.**—*Chronicle*, Feb. 3: In the Gen. Hooker the face of the 165-ft tunnel is in ore averaging fully \$25 per ton.

**BULLION.**—The shaft on this property has reached a depth of 50 ft, and shows pay streaks on both walls. The hanging wall is 12 ft wide, and the one on the footwall 2 ft. At 55 ft the ledge was crossed, showing the vein to be 12 ft in width between excellent walls. The average value of ore thus far taken out is about \$40 per ton.

**WHITE STAR.**—This property has an open cut on the surface which penetrates the ledge, and some ore assaying \$170 per ton has already been taken from it. The mine is located on the 200 level, which is now down 20 ft, and shows a continuous body of good ore to the bottom.

**SILVER FAME.**—Work is progressing steadily on this property under the management of Messrs. Medler & Hayse. There has been about 30 tons of ore taken out, part of which was milled some time ago and yielded over \$600 per ton.

**GOLDEN EAGLE.**—The original shaft on this property is now at a depth of 270 ft. A tunnel has been sunk on the 100 level, running along the course of the vein, and is 700 ft. At this level there is a section 23x40 ft, in which is placed a whim, for the purpose of hoisting from the main shaft and 200 level. A winze has been sunk at a point 162 ft east of the shaft, and between the above-mentioned levels, which also shows a continuous ore body. This winze connects with the 200 level, and shows the width of the ore at this point to be 7 ft, and assays \$90 per ton. A winze has been started from the 200 level, which is now down 20 ft, and shows a continuous body of good ore to the bottom.

**MINERAL CREEK.**—We extract the following from a letter received a few days ago from Mineral Creek section: "The reduction works are now at the river, 5 miles distant from the mines, between which points we have an excellent road, down grade, from the mines to the mill site. The engine, boiler and concentrator are on the ground. By the 10th inst. it is expected that 100 men will be at work. As far as work has progressed, the mines are all that could be desired, particularly the Ray mine, which has a solid mass of high grade ore 9 ft in width."

**SILVER DISTRICT.**—*Phoenix Examiner*, Feb. 5: Work continues unabated on the Silent, the quarry showing a very even distribution of metal throughout the rock. Connection has been made between the south drift of the Emma shaft and the north drift of incline shaft, and a north drift is now being run from the 100 level of the Emma shaft, south, when stopping will commence, after driving some distance. The Rover, under Judge Ringwald, shows in the workings a heavy body of ore grading from 30 to 4,000 ounces silver to the ton.

The furnace runs like a youngster making water flow from a hydrant. Two hundred and twenty-three bars of bullion were shipped on the steamer of the 23rd inst. The net value of which was \$12,000, and the richest bullion ever run from a furnace in America, assaying from 1,000 to 1,425 ounces of silver to the ton.

**CAVE CREEK.**—*Phoenix Examiner*, Feb. 4: C. L. Hall, of Cave Creek, came in town Tuesday evening, and from him we learn that the proprietor of the Carbonate Chief have completed arrangements for the sinking of another 100 ft in addition to the 25 ft already sunk, and that claim was taken by Mr. Hall. He also informs us that Chas. Flemming has recently made a strike in a claim just above Wood's station.

**QUAGATE DISTRICT.**—Julius Bauerlein came in last night from a prospecting tour to the Quagate district, 24 miles south of Casa Grande, Final County, and this morning left with us on his way to the Quagate. He reports that the mine called the "Julius," which indicates a startling bonanza beneath. The specimens shown us are filled with silver blanza, antimony and horn silver, average assay of which run from \$300 to \$1,400, while select specimens go as high as \$3,000 and \$4,000 to the ton. Mr. B. informs us that the croppings are bold the full length of the claim, and a float assay all the way from \$120 to \$550. One hundred tons of this ore lies on the dump, and the ledge crops out boldly for a distance of 700 to 800 ft. The Way Up, recently sold by L. P. Nash to Lyons & Co., is having

an arastra erected upon it. This is a small ledge, though very rich, Nesh's Golden Wonder has a 2-ft vein of \$60 gold ore, upon which has been sunk a 90-ft shaft. Two arastras are kept in motion upon ore from this mine, and the yield is highly satisfactory. The Geocela, owned by Bacon & Co., has an 80-ft shaft upon a 12-inch vein of rock which assays about \$50. On the Zulu Smith, Gowan & Co. proprietors, is a 125-ft shaft in a 2-ft vein of ore which runs from \$40 to \$50 per ton. There is about 80 tons of ore on the dump, which is being slowly ground up with an arastra. Messrs. Kildley & Brown did not visit either the Gowan, American or Seiber & Smith's mine, considered to be by far the best properties in the district, but they were told the mines were improving as work progressed. It is also said, upon good authority, that a 10-stamp mill will shortly be erected upon the Gowan mine.

**GLOBE DISTRICT.**—*Silver Belt*, Feb. 2: Ore is being shipped from the California mine to the Champion mill, where 95% of the pulp assay is obtained. The Centennial is looking well. We understand that the working force will be increased. The Empress is now producing some very fine copper silver glance ore. This is found the entire length of the drift which has been run from the shaft, and is considered rich and of a favorable character. We had the pleasure of examining several specimens of Red Rover ore, and found it to be rich in horn sulphurates and red hematite silver. The latter is generally known as Mexican red silver, and is considered a very favorable indication. Capt. Sharp reports about 60 men at work at Richmond basin, in the Mack Morris and La Plata.

### COLORADO.

**STRIKE ON CASCADE CREEK.**—*Georgetown Courier*, Feb. 3: Last week a strike was made in the Silver Ring lode, on Cascade creek, of a 5-inch vein of ore from which an average sample assay returned 238 ounces of silver to the ton. The lode is an extension of the Musevite, and is opened by an adit on the lode 140 ft long.

**THE ARIZONA.**—Since the recently reported strike of rich decomposed ore on this lode the developments have been pushed with vigor and in a systematic manner. Work is now progressing on the lode at 4 different points, by two parties of lessees and two sets of contractors.

**THE STEVENS.**—We learn from Col. R. A. Pomroy, the agent of the Stevens mine, that about 4 tons of ore are being produced daily, and 3 car-loads are shipped to the smelting works at Golden each week. There are 20 men employed at the mine, the work at present being confined to drifting and stoping the 11th level, 134 ft below the tunnel level, where there is a fine vein of galena ore from 20 to 24 inches in thickness.

**DUMONT.**—Mr. Dubois tells us that in the Unadilla a fine body of ore has been found at the bottom of an old shaft, 65 ft deep, on the Eagle lode, owned by that company. The shaft was sunk about 15 years ago, and since then has been partly filled with water and debris, until last week when Mr. Dubois had it cleaned out, and was rewarded by finding a 10-inch vein of ore that assays \$91 per ton in gold and silver and 10% copper. The 20-stamp mill of the Mansfield Co. is treating about 2 cords per day of ore from the Monitor lode, owned by Messrs. Knabb & Green, which returns from 5 to 6 ounces of gold per cord. The Mansfield Co. is running a crosscut tunnel for the Milton lode, which is in about 150 ft, and also taking good quartz from that mine.

### MONTANA.

**BELL.**—*Helena Independent*, Feb. 5: The Bell mine, of Butte, is one of the coming bonanzas, and is attracting considerable attention and enlisting local capital in its development. There are three lodes on the principal location, one of which is remarkably rich in both silver and copper. Near the surface, where the ore has become decomposed and is free from sulphur, native silver is found in geodes of wonderful richness and unmixed with copper. The ore in the mine is pure copper sulphides and assays carrying 70% of copper and silver varying from 500 to 2,000 ounces per ton. The first-class ore is said to average 400 copper and 100 to 300 ounces silver per ton, and the second 25% copper and 20 to 40 ounces silver.

**THE ALTA MONTANA CO.**—As an indication of the extent of operations at Wickes, we note a contract for 7,500 cords of wood with Messrs. Murphy, Neil & Co. of this city; their contract houses have a capacity for 25,000 bushels of charcoal, and they will be filled as soon as the spring work is settled; their stock of lime rock is good for 3 months run, and J. O'Neill has contracted for a 6 months' supply; the quantity of iron ore now delivered at the works daily amounts to 30,000 lbs.

**THE IRON AGE.**—Of Beaver creek, owned by Sites, Fisher & Nelson, promises to "loom into notice" before long. An incline 125 ft deep connects with a level running 65 ft westward, and another 35 ft in an opposite direction. In the former level, it is claimed, there are 3 ft of first grade and 2 ft of second grade ore, and in the east level a still larger body, that continues to increase as progress is made in that direction.

**THE KATIE.**—Owned by Kleinschmidt & Bros., is making an unusually fine showing. The discovery shaft is 52 ft deep and timbered for permanent use, and a tunnel 12 ft in width of solid pay, and the ore is averaging approximately 31 ft wide. It is free milling ore like the Buster, also owned by Kleinschmidt. This lode is only 3 ft wide, but is sufficiently rich to make it profitable to work it. Out of a 30-ft shaft the proceeds of the ore milled paid all hemming and milling expenses.

**THE GREAT WESTERN IRON MINE.**—In the Basin district, Messrs. Conley & Calvin have found a monster iron lode, said to be over 12 ft in width of solid pay, and the outcrop stands exposed above the surrounding country for a distance of 30 ft. It carries about 60% of iron, and is of good quality for fluxing purposes.

### NEW MEXICO.

**BLACK RANGE.**—*Santa Fe New Mexican*, Feb. 2: From the southern country come the most astonishing reports of the finds in the Black Range. They are confirmed by responsible men, gentlemen from the south whose word is freely relied upon, having yesterday afternoon reported that there is the greatest excitement over the new discoveries, and that it is the richest mineral country known. Since Victorio's death the whole country has been resorted to by prospectors, and thousands of locations are being constantly made. The mountains are full of mineral, and every man who visits them become at once an enthusiast. It is confidently predicted that in the spring there will be a rush for the mountains and one of the greatest excitement known.

### UTAH.

**SILVER REEF.**—*Cor. Salt Lake Tribune*, Feb. 4: Last evening the 30-stamp company discharged every man at work in their mines, and 200 men are idle. The Barbee & Walker discharged half their force, and it is rumored, will close both mill and mine at the end of the month. The reasons given by both being high wages and low grade of ore. The question for the Miners' Union now is whether to accept the rate of wages paid in other camps or none at all. At this meeting of the Miners' Union has been called for this afternoon to discuss the situation. It becomes a serious question with them now where bread and butter is to come from. It is quite unlikely that the 2 mining companies will resume work at former rates of wages.

A CONTEMPORARY remarks that "the successful mines in Arizona are being worked by practical men." This, says the *Eureka Sentinel*, is one of the most common-place utterances that most any one will admit; yet it is persistently disregarded. Delving into the hard strata of the earth and opening up its richness is not the special work of visionaries and soft-handed, and too often soft-headed young men who have no fitness whatever for the management of an industry that requires a peoniar knowledge and rare executive ability.



### The Whaler's Work.

Although our efforts lie especially in making known the treasures which lie in the earth, it is not unfitting to turn the attention of readers for a moment to the treasures of the deep. California has a considerable whaling interest, and the outfitting of vessels calls for certain amounts of our food products. There is also an amount of money derived from the sales of oil and bone abroad, which is distributed here and tends to build up our prosperity on shore. Aside from the venturesome whalers who go to this far north in pursuit of their game, there is another whaling industry which operates along our shores, and in which the residents in the coast counties are more or less interested.

It may not be generally known, but at various points on our coast line, especially south of San Francisco, there are whaling stations where a good many whales are caught every year. There is one of these at Amesport, Pigeon point, New Year's point, Santa Cruz, Monterey, Carmel bay, San Luis Obispo, and at several other places. Generally the station is placed where there is high land where a good lookout is kept. The boats cruise in this offing in the daytime, and the signal man ashore on the elevation, by means of a kind of semaphore, indicates to the men in the boat where whales are to be seen. They pull in the direction indicated and harpoon the whales, towing them ashore and cutting them up. The stations, though picturesque looking at a distance, are not places one would choose for a visit. The carcass, after the blubber is stripped from it, is cut up, and the bones are saved and sent to this city to be burnt for manure.

In some places steam launches are used instead of whale boats. As a general thing, whale guns or bombs are used instead of harpoons. The whales pass on down the

to the upper jaw-bone, near *I*, at the end of the junk, near *J*, and at the root of the case, near *K*, and through these holes straps are rove, and lines are made fast to those of the junk and case. The second cutting-tackle is then hooked in the strap which is around the upper jaw at *I*; the fluke-chain is slackened off, and the first tackle fastened to the piece is lowered, when all hands have on the head-tackle, forcing the whale down again, and thus bringing the creature's head up, and the body nearly to a vertical position. The officers upon the cutting-stage, with their keen spades, cut away between the bones and junk from *L* to *C*, and the enormous weight of the whole fatty mass of this head hanging down opens this gash between it and the skull-bone; then, cutting cross the end of the junk and root of the case, from *E* to *F*, completes this process of cutting off the head, which is temporarily made fast to the ship's quarter. The fluke-chain is then hauled in again, and the blubber is rolled from this body in the same manner as that of a baleen whale, until coming to the region of the small, when it is unjointed just behind this vent, and the remaining posterior portion of the animal is hoisted on board in one mass. The head, as it is termed, is then hauled up to the gangway, and one of the tackles is hooked into the junk-strap at *J*, and by means of this cutting-tackle purchase, this head is taken in whole, if the whale is under 40 bbls.; but if over that size, it is raised sufficiently out of the water to cut the junk from the case, when it is hoisted on deck. The case is then secured by one or both tackles, hove up to this plank-sheer, and an opening is made at its root, of a suitable size to admit this case-bucket, when the oil is bailed out, or the whole case is hove in on deck before being opened; which finishes the cutting-in of a sperm whale.

The "head" or case oil is, when bailed out, as clear and limpid as water, but after a short time thickens and hardens into a mass as purely white as the newly fallen snow. The body oil is of a coarser nature. For all practical purposes, the

### Physical Studies of Lake Tahoe.—No. 7.

[Written for the Press by Prof. JOHN LE CONT.]

#### Colors of Sky and Water.

This consideration of the dichroic properties imparted by the presence of finely divided matter in a state of suspension, likewise harmonizes the views of the older physicists with the deductions from modern investigations. It was long ago insisted that there existed a complete analogy between the tints of the sky and those of the purest natural waters; indeed, that the causes of this blue color of the sky and the red tints of sunrise and sunset were identical with those of the pure natural waters under corresponding circumstances. In other terms that, in both cases, the blue tints are due to reflection and the red to transmission. In relation to this sky, these have been long recognized as the true causes of its variable tints. Now we have shown that the light transmitted by a column of natural water is in reality "yellow, orange, or red, like the light of sunrise or sunset," while the light reflected from the attenuated suspended particles partakes of the various shades of blue, like the hues of the sky. Hence the analogy is completely verified upon the same basis of experiment. Moreover, the thermotic researches of Prof. Tyndall and others, seem to demonstrate that liquids which possess absorbing qualities for radiant heat preserve these properties in the gaseous or vaporous state. In other words, when a liquid assumes the vaporous state its power of absorbing heat rays follows it in its change of physical condition. Hence, it appears that the absorption of the thermal rays seems to depend upon the individual molecules of the compound, and not upon their state of aggregation; for the change into vapor does not alter their relative powers of absorption. This power asserts itself correspondingly in the liquid and in the gaseous states. Now, although we have as yet no direct experimental evidence in regard to the relative pow-

er of reflection back to the observer more or less of the transmitted light must, evidently, modify the resultant tint presented to the eye. According as the bottom exhibits various shades of white, green, yellow or red, the mingling of these tints with the blue reflected from the suspended particles in the intervening stratum of water, must give rise to various chromatic hues, from bluish-green to yellowish red.

There is much uncertainty in relation to the origin of this color-designation of the Red sea; but it is by no means improbable that it arose from the abundance of red coral found in it, which imparts a reddish tint to the waters occupying the shallow portions. The waters of the Bay of Loango, on the western coast of tropical Africa, have been observed to be always strongly reddish, as if mixed with blood, and Captain Tuckey assures us that the bottom of this bay is very red.

(c) It is scarcely necessary to remark that as the tint of this light coming from the bottom to the observer is modified by the thickness of the intervening stratum of liquid—the color due to the mingling of it with the blue reflected from the suspended particles must depend, to some extent, upon the depth of water as well as the hue of the bottom. (d) Lastly it is very obvious that the amount and character of the suspended matter existing in this water, must, more or less, modify the color presented to the observer. Near the mouths of rivers the sea exhibits tints evidently depending upon the color of the suspended materials discharged into it. Thus, the Yellow sea derives its name from the hue imparted to its waters by the large amount of yellow sediments discharged into it by the Hoang-Ho and Yang-tse-Kiang. Moreover, the variety of colors of the waters of the seas may, in many instances, be traced to myriads of living vegetable and animal organisms diffused in the liquid. The unfortunate Captain Tuckey, while navigating the sea on the western coast of tropical Africa, found that the waters began to grow white on entering the

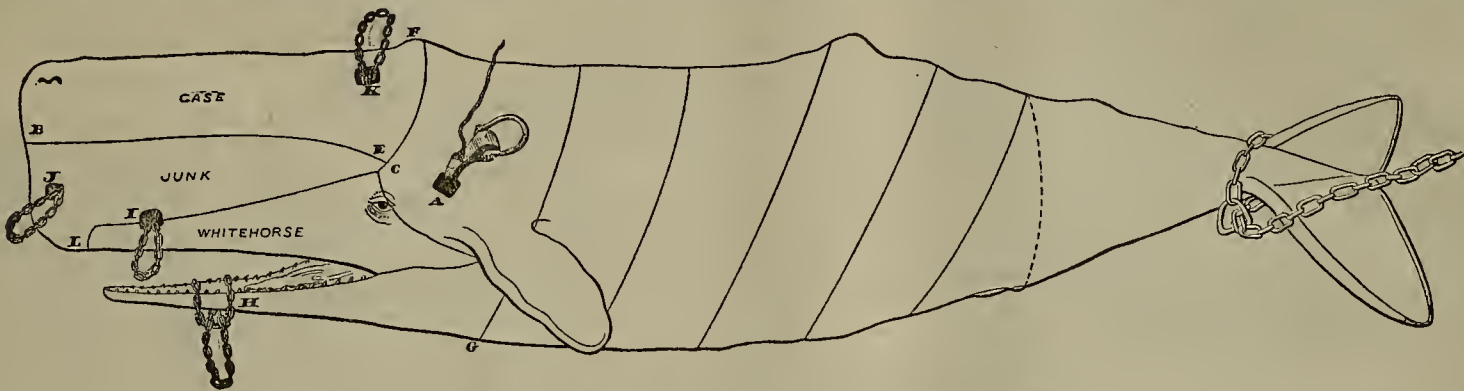


DIAGRAM SHOWING THE DIVISIONS OF THE WHALE MADE BY THE WHALERS WHEN "CUTTING IN,"

oast at certain seasons of the year, and are generally at pretty regular distance from the shore. This is the only place in the world, we believe, that this sort of whaling is carried on. It is usually necessary to employ vessels to go down "on the line," or "on Japan," or among the South Pacific groups, or up to the Arctic. This port is a place of rendezvous for the Arctic and South Pacific whaling fleet. Every winter a couple of dozen whaling vessels are laid up in Alameda creek in front of Oakland. The coast whaling traffic is pretty extensive, and gives employment to several hundred men, but it is difficult to get at the exact production. The Arctic fleet brought back last year 22,278 bbls. of whale oil, 284,700 lbs. of bone and 14,850 lbs. of ivory.

The methods of the whalers are full of interest, and volumes have been written upon the history and achievements of their industry. We introduce at this time an engraving and description illustrative of the manner in which the monsters are disposed of. Our authority is Scammon's "Marine Mammalia."

"The first procedure after the animal is fastened to the ship, is to cut a hole through the hubber, between the eye and fin, at *A*, as seen in the accompanying outline sketch, then, after cutting the scarfs on each side and around this end of the first blanket-piece, a hubber-hook, attached to one of the cutting-tackles, is inserted into this hole at *A*, and the piece raised by means of the tackle until the whale is rolled on its side; then the line of separation between the upper jaw and junk is cut, as from *L* to *C*, and if a large whale, the line of separation is cut between the junk and case, as from *B* to *E*, and a cut is made across the root of the case from *E* to *F*; a scarf is also made around the root of the lower jaw, from near the corner of the mouth, *G*. A chain-strap is then put on the jaw near *H*, and hooked or shackled to the second cutting-tackle, and raised by that purchase, while the other tackle attached to the piece is slackened off, if need be, so as to let the whale roll upon its back; when, by means of the tackle attached, and by cutting away this tongue and the adhering flesh, the jaw is wrenched from its socket and placed on deck. This being accomplished, the first tackle, which is attached to the piece, is hove up by means of the windlass, until the whale is rolled over to its opposite side, when the lines of separation are cut to correspond to those made opposite. Holes are then mortised through the head close

to the general principles of "cutting-in" the sperm whale will apply to the same process in regard to the right or bone whale; and for a thorough description of these cetaceans, the implements used in their capture, and the saving of the oil, the work quoted above will be found an excellent authority.

**CALIFORNIA HARBORS AND RIVERS.**—The River and Harbor bill has been substantially completed by the House Committee on Commerce. California items in the bill, as it now stands, are as follows: For continuing the improvement of Oakland harbor, \$60,000; for Wilmington harbor, \$12,000; Sacramento river, \$30,000; San Joaquin river, \$20,000. The amount for the improvement of Petaluma creek has not yet been fixed, but will be about \$10,000. The amount for Oakland harbor would have been larger were it not that about \$150,000 of the former appropriation still remains unexpended. The committee has cut down the engineer's estimate for all river and harbor improvements throughout the country, on an average to half, and in some instances to one-fourth.

**EXPLOSION IN A MINE.**—Henry Minear has commenced suit in the Superior Court against the Mount Jackson quicksilver mining company and James A. Meade, its President, to recover \$15,000 damages for personal injuries sustained Nov. 20, 1880, at the mine, near Guerneville, Sonoma county, by reason of being ordered by defendant, the President, to go into the south drift and perform some work, which necessitated the use of a light. This complaint alleges that while performing this work ordered, gases that had oozed out of the earth and filled the interior of the drift took fire and exploded, killing a Chinaman who was assisting plaintiff, and injuring plaintiff's eyesight, and causing other severe injuries.

The following companies have been dropped from the list of the Boston Mining Exchange: Arnold, Belcher, Bodie, California, Con. Virginia, Chrysolite, Eureka Con., Grand Prize, Hukill, Mexican, Northern Belle, Ophir, Sierra Nevada and Union Con.

ONE of the iron steamers contracted for by the Oregon Steam Navigation Company was launched last week at Chester, Pa. She is 312 ft. in length, 39 ft. beam and registers 2,630 tons. She will be known as *Williamette*.

ers of absorption of various vapors for the different luminous rays; yet these thermotic results render it analogically probable that vapors carry with them the same relative absorbing powers for the different rays of light which their liquids enjoyed. Hence we may conclude that if the mixture of air and aqueous vapor constituting our atmosphere were perfectly free from suspended particles (ultra-microscopic globules of water no less than solid corpuscles) it would probably, like distilled water, absorb more copiously the rays forming the red end of the solar spectrum than those of the blue extremity, so that the green-blue tints would appear by transmitted light. But, as in the case of natural waters, the presence of finely-divided matter in a state of suspension in the atmosphere, by scattering the shorter waves of light, neutralizes and overcomes the effect of selective molecular absorption; so that, in reality, yellow, orange and red are the tints transmitted at sunrise and sunset, while the light reflected from the attenuated suspended particles gives us the blue color of the sky. It thus appears to be in this highest degree probable that the dichromatic properties of the atmosphere are due to the same principal causes as those of the waters of lakes and seas.

#### Cause of Other Colors of Certain Waters.

Besides the rich blue and green tints which we have been considering, the waters of lakes and seas, in some places, present various other hues. From the preceding discussion it is evident that the shades of color, presented to the observer, will depend upon several circumstances, viz: (a) the presence of coloring matters in solution; (b) the color of the bottom; (c) the depth of the water, and (d) the amount and character of the suspended matters present. (a) There are certain natural waters which obviously derive their colors from the presence of coloring substances in solution. In most cases various organic matters seem to be coloring agents. Thus the waters of pools, ponds and small lakes, as well as those of their tributaries, in certain level forest-clad regions, frequently exhibit various shades of brown, and sometimes present a rich cherry color when viewed in considerable masses. These tints, doubtless, arise from the diluted colored infusions produced by the percolation of the meteoric waters through decaying leaves and other organic substances. (b) The color of the bottom, when the water is sufficiently shallow to

Gulf of Guinea, and in the vicinity of Prince's island, his vessel appeared to be moving in a sea of milk. He ascribed this white color of the water to the multitude of minute animals, (many of them phosphorescent), diffused near the surface, which completely masked the natural tint of the liquid. In like manner according to the observations of Captain Scoresby, the olive green waters of certain portions of the Arctic seas, owe their color to the presence of myriads of medusae and other animalcules.

**MINING ACCIDENTS.**—Every trade is subject to its peculiar line of accidents. Thus the carpenter is liable to split his great toe with a broad ax or chip off his kneecap with an adze; the blacksmith is exposed to burns and bruises, the stonemason to falls and spawls of rock in the eye; the sailor to falls and death by drowning, but the miner is exposed not only to the accidents of his own trade but also those incident to all others. He may be drowned, like the sailor; killed by an explosion of gunpowder, like the soldier; burned to death, like a martyr at the stake; scalded in hot water, crushed by falling rocks and caves of earth, wound up in machinery, ground under the wheels of a grapple, have his head split open with an ax in timbering, his legs and arms broken by falling through floors, his neck being dislocated by being run up into the shaves, his head broken off by falling from a cage, and his whole body knocked out of human shape and reduced to a pulp or scattered in shreds by falling down a shaft. Also, in falling down a shaft, particularly through the pump compartment, there are so many projecting points and sharp corners of iron that he may suffer all the cuttings and rendings incident to any or all the trades of the world. In other trades, we may calculate and to a considerable extent guard against the accidents that are liable to happen, but in mining accidents are constantly happening, the like of which was never before heard of. The miner is exposed to the accidents common to the use of tools of various kinds, falls and falling things, fire, floods, explosions, suffocating gases, scalding water and to machinery of various kinds moving in all directions.—*Virginia Enterprise*.

This San Francisco Branch Mint coined in January, \$1,870,000 in gold, and \$1,000,000 in silver. Total, \$2,870,000.



## Tarrytown Mining District.

## A Mineral Region Scarcely Prospected.

From a letter to the *Bodie Free Press*, we take the following items of the above named Inyo county camp: Tarrytown district is situated on the eastern slope of the White mountains, about 4½ miles east of the Mono line, in Inyo county, California, and about 6 miles west of Deep Spring valley. This district was organized some time in November last, and S. P. Roberts was elected Recorder. Now, it is not the intention of the writer to "blow up" this country, but to give readers a few simple facts in regard to the mineral resources, the advantages of reducing ores, etc.

The mineral belt is some six and a half miles in length by about one and a half miles in width. The formation is lime and salt, the veins or lodes running in a northerly and southerly course and dip west. The ores are what is known as argentiferous galena or lead ores, free from any rebellious metals. Having had some 15 years' experience in handling and working this kind of ore, and having passed the last eight months in this camp, I give the following: There was a great

## Many Locations Made Last Season.

And not one hint shows large quantities of ore. Seventy-four assays out of as many locations average as follows: Silver, \$52.80; gold, \$5.30, and 48% lead per ton. Most of these assays were made at the Standard office. There are five claims that have been worked, which I never saw equalled for the amount of work done. The Heritage mine, owned by Mr. Barry, has done considerable work. A tunnel cuts the vein some 10 ft. from the surface, where the ledge is three and a half ft. wide and assays \$124.55 in silver, \$15.60 in gold and 25% in lead. A large quantity of this ore is on the dump. Mr. Barry also owns a claim called the Alta, a two and a half ft. vein of high grade ore, some 75 to 80 tons of which is on the dump. There is one mine which has an incline shaft down 95 ft. on the ledge, showing a well defined vein from three to four and a half ft. of solid metal from the surface to the bottom of the shaft, between the walls, which are slate foot-wall and lime hanging-wall. One level was run 33 ft. in ore, the average assays being \$81.24 in silver, \$8.50 in gold and 51% lead. This mine, with 20 men at work, will keep a furnace of 20 tons capacity in full blast night and day. There is something like 300 tons of this ore out. A six-mule team can be driven to the mine. Just above, some 200 yards, is another valuable property, which has been sunk on in different places, showing a well defined vein from 3½ to 4 ft. of carbonate and chloride ore of high grade, assaying \$121.40 in silver, \$15.12 in gold and 52% lead. There are several places on the line of the lode showing a ledge of nearly solid metal six ft. between the walls. This mine alone is capable of keeping a 40-ton furnace running, with 20 men at the mine. A large quantity of ore has been extracted from this claim. There is still another claim, supposed to be the extension, showing a well defined ledge 1½ to 3 ft. wide of solid metal. The shaft on this claim is down 60 ft., showing three ft. of fine mineral at the bottom, which assays \$71.20 in silver, \$6.18 in gold and 45% lead. This also has a large quantity of ore out. There are many other fine properties I could speak of, and which I may have occasion to mention soon.

## Water and Timber.

Within 200 yards of the mines I have spoken of is a flat and grassy area of about 100 acres. At the head of this is a valuable spring, which pours out not less than 50 inches of water during the driest seasons. This spring forms what is known as Wyman creek, which empties into Deep Spring valley. There is also another spring some 100 yards from the mines, which runs some eight inches. There is not less than 10,000 acres of fine tamarack timber, not more than three miles from the mines, with a good natural road into the same. This timber will make good lumber. There are also thousands of acres of nut-pine timber, the finest I ever saw, lower down and near the mines, which makes the best of coal, and which can be made cheaper than in any other county on the Pacific coast. These mines and the facilities for working excell those of Eureka, Nevada, or any galena camp in Utah for the amount of work done. This is my simple opinion of them, and the country is open for any one to examine.

**THE CHLORINATION PROCESS PATENT.**—The case of G. F. Deitken, the well-known and accomplished Grass Valley metallurgist, against the Providence Gold and Silver Mining Co., is on trial before a jury in the U. S. Circuit Court. The plaintiff claims that in July, 1863, he obtained letters patent for an improved apparatus for the extraction of gold from pyrites by the use of chlorine gas, and that he has ever since been the owner and has had exclusive right to the use of the invention in all parts of the United States, excepting Amador county, Cal.; that in July, 1872, and prior and subsequent to that time, the corporation defendant, in the county of Nevada, Cal., used the improved apparatus, in violation and infringement of plaintiff's rights, to his actual damage in the sum of \$10,000. Plaintiff seeks to recover such actual damages and a further sum, not exceeding three times the amount of the actual loss sustained, as allowed by statute. Defendants interpose a general denial.

## USEFUL INFORMATION.

## How Handles are Made.

Very little has ever been written or published relating to this industry. Nevertheless it has taken wonderful strides and grown to mammoth proportions during the past decade. More than \$5,000,000 worth of handles and other commodities manufactured in direct connection with this industry, are turned out every year. When we come to consider that every house, store, manufactory, and barn in this broad land has from five to twenty handles in every day use, we will not be surprised, or think the above figures overdrawn. It is our intention, however, to confine ourselves more especially to the manufacture of implement handles in this article.

In the first place, it is essential that the manufactory should be situated in a locality where can be found an abundance of white ash, birch, or maple timber. The logs are cut in bolts of from four to twenty feet long, according to the length of the handle to be made; then drawn to the factory and sawed into planks. Here, great care must be exercised to saw the timber with particular reference to the grain. Only sawyers of years of experience and adepts in their particular line should be employed. The durability and value of the handle depend largely upon the first sawing.

The planks are sawed, cut off, made of a uniform length, and taken to the lathe to be turned. But a few years ago, a bundled finished handles was considered an unusually good day's work for a single man—to-day, one man with a gauge lathe, is capable of turning out from seven to 1,200 per diem, according to the length and shape of the handles. The handles are next taken to the chinking machine, where the top end is rounded and chucked; the bottom is at the same time seized or chucked to fit the ferrule. This is rapidly done, one man being able to chuck half a carload per day. It should be remembered that the handles are all turned while the timber is yet green. After the chucking process, they are transferred to the dry kiln to be seasoned. If the handles are to be bent, they are steamed and placed in forms to cool, after which they are taken to the finishing room and polished on sand belts.—*Industrial World*.

**PARAFFINE AS A WOOD PRESERVER.**—A German chemist, Dr. Sebal, has established the useful fact that wood impregnated with paraffine is preserved from rot, especially when employed in alizarine manufactures, where it is exposed to the decaying action of damp, acid, and alkaline lyes. Wooden vessels which become totally rotten in two months, last for two years when impregnated with paraffine. The preparation of the wood is effected by drying it in warm air for three weeks, then steeped in melted paraffine to which has been added some petroleum ether or sulphuret of carbon. In preparing this bath great care must, however, be exercised, owing to the inflammability of its ingredients. To prevent the paraffine from escaping from the pores, the wood should be coated with oil varnish or soluble glass, washed after drying with diluted hydrochloric acid. The silicic acid thus formed clogs up the pores from the outside, and protects the paraffine from the action of water. Paraffine, melted with equal parts of linseed or rapeseed oil, is also, according to Dr. Sebal, useful for coating iron vessels, which in chemical manufactories are otherwise very liable to rust.

**HARD SOAP BY A COLD PROCESS.**—Mr. R. F. Fairthorn, Ph. D., has contributed the following recipe to the *Druggists Circular*: A good hard soap can be easily produced if four lbs. of olive or sweet almond oil mixed with two lbs. of soda lye, of the strength of 36° Baume, are stirred until of the consistence of thick paste, when it should be poured into molds, covered by several folds of muslin and kept in a warm room for 20 hours. By this treatment the process of saponification, or union of the acids in the oils with the alkali, is complete. When these materials are first mixed the temperature of the mass rises, and in order to effect the entire union of ingredients so as to form the compound called soap, it is necessary that the heat thus generated should be maintained for some time, hence the necessity for covering the molds and keeping them in a warm room. He has found that it is desirable to use oil that is slightly rancid, or, if free from rancidity, to add about 10% of oil that has become so. Oil that is perfectly sweet requires two or three days to effect saponification.

**A VARNISH** of cement, which goes by the name of Chinese varnish, and renders card-board or thick paper as hard and hoarse as papier mache, is easily prepared from blood, lime, and alum. Three parts of fresh blood, well beaten up to prevent the formation of fiber, is mixed with four parts of slacked lime, and a little alum, the thick-flowing mixture that results being at once ready for application to paper or card.

**TREATMENT OF OLD CARRIAGES.**—Previous to repainting or revarnishing old carriages it is necessary first to wash clean and rub down the surface with a wet cloth and ground pumice powder until it appears quite dead, or without gloss. After a second washing and drying with wash leather it is ready to receive paint or varnish.

**TO PREVENT CLOUDING OF MIRRORS BY MOISTURE.**—A writer in the *Manufacturer and Builder* says that by coating over the surface of glass mirrors with glycerine their clouding by the accumulation of condensed water vapor will be prevented for a considerable time. The attraction of the glycerine is so great for the water as to absorb the latter as fast as deposited. This hint may prove of great use to dentists, who are frequently troubled by the clouding of mouth-mirrors, and it may also be of value to those who are compelled to shave themselves in chilly apartments.

An invention which will considerably influence architecture and sculpture has recently been made by Dr. Gehring, at Landshtut, in Bavaria. Dr. Gehring, by means of an emulating liquid, is said to render any kind of stone or cement harder than granite, and gives it the absolute and indelible appearance of any other mineral desired. The enamel may also be applied to metal, which it is said to completely protect from rust.

## GOOD HEALTH.

## Glycerine for Acidity of the Stomach.

A late number of the *Boston Journal of Chemistry* reprinted from the *London Lancet* Dr. Ringer's article upon the use of glycerine in flatulence, acidity and pyrosis. Dr. J. A. Lewis, referring to the same article, in a communication to the *Louisville Medical News*, says:

"I desire to add my testimony to its value, so far as regards acidity and flatulence. For this form of indigestion, so common, and for the relief of which so many persons resort to the daily use of soda, glycerine is a remedial agent of no mean value. I have used it for several months with my patients troubled in this way, and in a majority of cases the results have been gratifying.

I had no knowledge of its use for dyspeptic troubles, and was led to the use of it much in the same way as reported by Mr. Ringer. I knew of its property of preventing fermentation, and especially of its use by druggists in preserving their syrups from acidity. I was led to a trial of it upon this principle, and soon became satisfied of its real value. I have always prescribed it in large doses, never less than two teaspoonfuls to a tablespoonful for an adult, to be taken in a wine glass of water immediately after eating. It does no good after fermentation of the food has taken place in the stomach.

It is no specific, no cure-all, but certainly does afford alleviation, if not a cure, in many of these cases, and is worthy of a place among the remedies in use for this very common ill of the flesh.

**SICK HEADACHE.**—This complaint is the result of eating too much and exercising too little. Nine times in ten the cause is in the fact that the stomach was not able to digest the food last introduced into it, either from its having been unsuitable, or excessive in quantity. A diet of bread and butter, with ripe fruit or berries, with moderate and continuous exercise in the open air sufficient to keep up a gentle perspiration, would cure almost every case in a short time. Two teaspoonfuls of powdered charcoal in a half-glass of water, and drank, often gives instant relief. Sick headache with some persons comes on at regular intervals, and is a signal of distress which the stomach puts out to inform us that there is an over-alkaline condition of its fluids; that it needs a natural acid to restore the battery to its normal working condition. When the first symptoms of headache appear, take a teaspoonful of lemon juice clear, fifteen minutes before each meal, and the same dose at bedtime. Follow this up until all symptoms are past, taking no other remedies, and you will soon be able to go free from this unwelcome nuisance. Many will object to this because the remedy is too simple; but many cures have been effected in this way.

**DANGER IN THE SLEEPING-ROOM.**—In fighting that terrible enemy, sewer gas, it will not do to depend on the plumber. In sleeping-rooms the syphonage of the trap is the opening of the gate of death; and yet, strange to say, thousands of people hear nightly this death-rattle in their rooms, and do not know what it means. Now, if one can't have effective plumbing, the next best thing is to know what to do about it. As syphonage implies the breaking of the water-seal that acts as a barrier against the free admission of sewer gas, it is, first of all, important to know what traps are defective. When one hears a low, gurgling sound in the wash-basin, the time for action has come. Any noise beneath the wash-basin, at any hour of the day or night, when the water is not turned on, means death. The gurgling sound is caused by a draft of air down the escape-pipe, which breaks the water-seal. Of course the services of the best plumber should be had at once; but in the meantime fight the enemy. First turn on water and fill the trap. Then put in the plug, fill the basin half full of water, and with wax or soap seal up the overflow holes. Lower a window and let in the outer air. Until the sound of syphonage ceases, and you are absolutely certain that the trap can be relied on, stand guard over it. Keep the overflow holes sealed and the plug in, no matter at what risk of flooding lower rooms, in case some one is

thoughtless enough to leave water turned on. If every family would act on these hints we would have less diphtheria.

## Should a Baby be Fat?

While there is a measure of truth in the assertion that fat babies are not necessarily healthy, the following much quoted extract from a physician's letter to a Boston paper is likely to do mischief by its extravagant condemnation of fat. Speaking of fatty degeneration the physician says:

"Many infants do become thus diseased before they are three months old. This stops the growth and leaves the poor deceived parents nobbling but increase in weight to boast of; and when the poor little victim to his own greed and his parents' folly gets to the end of his tether he melts away like butter in a hot oven, and then it is seen how poor (in flesh) he has been all the time. Few comprehend the broad difference between flesh and fat. The first is lean meat—muscle—the result of growth; while fat—I don't care how hard and solid it may be—is the product or accumulation of unexcreted excess. This is why no one bets a dollar on a fat horse or a fat man—they are 'soft' and 'can't stay.' It is every whit as true of a fat baby. The only wonder is that any infant lives sixty days from birth. Fed before birth but three times a day, he is after birth subjected to 10 or 20 meals in 24 hours. Before birth he grows at the rate of about 10 pounds per year, after birth he is permitted to fat at the rate of 50 pounds per year until chronic dyspepsia or some acute disease interferes. Feed of a kitten, calf, colt, or a young robin—they are, and remain while growing, but little more than skin and bones and fur or feathers, because unable to get enough to fatten them, and they never die—rarely have any disease. Children are never fairly 'out of the woods' until they reach the lean age and have pipe-stem legs and arms, with no rolls of fatty tissue anywhere about them. Could they be kept so from birth and not permitted to over-indulge, so that their appetites would always be reliable for plain food, they would have no infantile diseases to enrich our pockets."

Why should the kitten, the colt, or the young robin be taken as a model of infantile health, rather than the puppy, the bear cub, the pig, or the young pigeon?

It is the nature of some young animals to be lean and healthy; of others to be fat and healthy; and there is as marked a difference in the natural tendency of young children. Infants of the same parentage and fed at the same breast will differ in this respect, and both be healthy. Fat laid on at the rate of "50 pounds a year" is quite another matter, and one not liable, we take it, to be a common cause of anxiety. Injudicious feeding is more apt to show itself in lack of fat, and lack of proper muscular tissue as well. That sort of leanness is much too common in young humanity.—*Scientific American*.

**LEARN TO SLEEP.**—The true art of sleeping is the power to shut one's self within one's self under any circumstances. The man who can thus take rest is refreshed and strengthened under many circumstances which would keep other people weary and wakeful. He is master of every situation as regards his own rest. Some men, by long habit, find themselves able to take sleep with the same ease that others would take a glass of water. They can sleep either while perched on a high stool or rattling along in a railroad car at 40 miles an hour. The economy of wear and tear on the lives of such people is wonderful. The man who cannot sleep unless he has first removed his clothes, put out the light and climbed into his bed is at a great disadvantage. Greater yet is his disadvantage if he can sleep in no bed but his own. There are some who are possessed with the notion that their own bed is the only one in which they can slumber. These people are utterly wretched when traveling, or obliged to absent themselves from home on business. But he who has accustomed himself to sleep, can enjoy that boon at any time or place, and is made better and happier thereby.

**WORMWOOD AS AN INSECTIFUGE.**—In a communication to the French Academy (*Comptes Rendus*, p. 607), M. Poitrot attributes to the wormwood (*Artemisia absinthium*) extraordinary properties as an insectifuge. He states that among the plants of this species that cover the vast plains of North America, he has never seen flies, ants, or any other kinds of insects; and to these he adds worms, scorpions, rattlesnakes, and other serpents. He proposes to use this property in the extinction of the phylloxera, as he believes this pest would not be able to go through the necessary metamorphoses in a soil manured with the leaves and stalks of the plant.

**TAKE CARE OF YOUR HEALTH.**—One of the most foolish things that men or women can do is to kill themselves, or to exhaust their energies and wreck their health. No one is benefited by such imprudence; nor does any one ordinarily thank them for their pains. What you are is more important to ordinary minds than what you have done. You may have performed immense labors, but if you are sickly, and son, and dyspeptic, and querulous, people will forget your services, and he attracted by the superior personality of others who may have accomplished far less than yourself.





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G. H. STONG

## SAN FRANCISCO:

Saturday Morning, Feb. 12, 1881.

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## The Week.

The great storm which has flooded the State has ceased and the waters are subsiding, but from all directions we hear complaints of destruction and damage. As yet, however, it is possible that many of these reports are exaggerated and a more calm survey of the situation will show that the money loss is less than was supposed.

Considerable damage has been done by the heavy rains in breaking ditches, washing away flumes, etc.; but the ravines and gulches have been cleared of tailings, tail races have been swept out, and the ground well soaked, so many of the surface miners have been rather benefited.

In quartz mining operations, however, the heavy rainfall has been detrimental. Mines supplied with pumping machinery adapted to handle an ordinary flow of surface water, have been flooded by the sudden and large rainfall, by reason of the inability of pumps to handle the increase. Some of these mines will be able to start up in a few days, but others cannot begin again until the rainy season is over.

In another column will be found the details of legislative action during the week. The most important action is that on the debris matter.

There is no special news to note in mining matters. The passage of miners southward still continues, and Arizona and New Mexico are likely to be pretty thoroughly prospected this summer.

The latest excitement in mining affairs is in the direction of Alaska, where rich gold finds are reported. We have referred to these more at length in another column. The region about Alaska is so far from here that it is likely that some miners will think it better than the regions nearer home; but it is likely that there are men enough there now to work all the mines that will be found.

## Copper.

The fluctuations in the value of copper during the first six months of this year, 1880, were very severe and rapid, while during the latter part of the year there has not been very much change. In the English market ore of good produce has varied from 15s. 3d. to 11s. 3d., and 11s. 9d. to 12s. 4d., per unit.

Opening at £65 10s., a strong demand sprang up early in January, 1880, for Chile brass and English copper, for the United States and for manufactured for India, causing considerable excitement and an advance in price. Charters continuing large, and stocks increasing, values gradually declined until, in March, the advance of £8 per ton gained in January was lost.

In June again there was a speculative up and down, but since that time fluctuations in values have been slight.

It seems there has been a falling off in the exports for Chile during 1880 of about 700 tons, compared with the previous five years, and of 8,500 tons compared with 1879. Yet the production of precipitate and pyrites in Spain has steadily advanced and is now 85% greater than in 1875-76, and 4,350 tons in excess of 1879.

According to the estimates based on figures in James Lewis & Son's circular, the English consumption of copper shows an increase in 1880 of nearly 2,000 tons over 1879, and 6,000 tons over 1878. The decreased export of foreign is accounted for by large shipments of Chile bar direct to France.

As a matter of curiosity we will compare the figures for three years, showing the extent of the business in England.

First taking the imports with the contents of ore regular and precipitate reduced in figures to "tons fine."

IMPORTS.			
	1878.	1879.	1880.
	Tons Fine.	Tons Fine.	Tons Fine.
Ores.....	13,087	11,555	13,282
Regulus.....	5,153	7,650	6,597
Precipitate.....	13,173	18,158	18,205
Pyrites.....	14,443	12,041	16,447
Chile Bars.....	22,785	33,534	24,258
Australian Bars.....	8,651	9,845	9,400
Bars of other Countries.....	7,914	3,291	2,845
Totals, Tons Fine.....	82,218	95,474	91,040
EXPORTS.			
	1878.	1879.	1880.
	Tons.	Tons.	Tons.
Eng. wrought & unwrought.....	30,008	31,771	31,783
Yellow Metal.....	14,573	16,767	15,881
Foreign, unwrought.....	12,719	17,837	14,695
Total.....	57,299	66,345	63,559
Difference, Tons Fine.....	27,833	29,124	27,481

Stocks of all kinds in Eng. at end of year, 1879, 1880.  
Apparent Eng. cons. of French copper, 17,586 23,233 25,190  
Production of Cornish mines..... 3,338 2,884 2,754  
British ores sold at Swansea..... 412 157 234  
Apparent Eng. consumption of copper, 21,255 25,394 27,778  
Stocks of copper in Fr. at end of year, 1,139 4,600 6,462

The English imports of Chile ores in 1878 were 10,314 tons, and in 1877, 7,949 tons; but they have gradually decreased, till in 1879 only 461 tons were imported. The importation of Cape copper has increased to a slight degree. The imports from other countries have increased largely however, being nearly double now what it was in 1875. The import of Spanish precipitate and pyrites in 1878 was 27,616 tons fine; in 1879, 30,199 tons fine, and in 1880, 34,652 tons fine.

Import of Chile ores, regular, bars and ingots, into England in 1878 were 37,990 tons fine; in 1879, 44,137 tons fine, and in 1880, 33,993 tons fine.

Import of Chile copper into France in 1878 was 6,364 tons fine; in 1879, 3,600 tons fine, and in 1880, 10,545 tons fine.

The total import of Chile copper into both England and France in 1878 was 44,354 tons fine; in 1879, 47,743 tons fine; in 1880, 44,543 tons fine.

The export from Chile to all countries was, in 1878, 46,931 tons fine; in 1879, 49,500 tons fine, and in 1880, 41,000 (estimated) tons fine.

To conclude, we give a table from James Lewis & Son's circular, showing the average value of Chile here and ore, and the available stocks of copper in England and France for the period named:

	Bars.	Ore.	Stock.
	£62 10s	12s 9d	Tons Fine.
Average.....1880	55s 5s	11s 6d	45,047
Average.....1879	55s 5s	11s 6d	41,943
Average.....1878	55s 5s	11s 6d	35,743
Average.....1877	55s 5s	11s 6d	29,134

**MINING DIVIDENDS IN JANUARY.**—The following mining companies paid dividends in January: Deadwood-Terra M. Co., 25c per share, \$50,000; Enreka Con. Mining Co., 50c per share, \$25,000; Homestake Mining Co., 30c per share, \$30,000; Idaho Mining Co., \$5 per share, \$15,500; Indian Queen Mining Co., 4c per share, \$5,000; Indian Queen Mining Co., 4c per share, \$5,000; New York Hill Mining Co., 20c per share, \$10,000; Northern Belle Mining Co., 50c per share, \$25,000; Ontario Mining Co., 50c per share, \$50,000; Silver King Mining Co., 25c per share, \$25,000; Standard Con. Mining Co., 75c per share, \$75,000; Western Mining Co., 75c per share, \$75,000. This makes a total of \$390,500 as compared with \$403,900 in the same month of 1880.

THIRTY men are at work at the mines at "Placeritas," nine miles from Laguna, San Diego county. Twelve astras are at work. A chunk of gold sent in during the week made return of \$83.

## Miners' Wages at Silver Reef.

As will be seen by an item in our "Mining Summary," there is trouble at Silver Reef, Utah, the "Sandstone district," about wages. Inasmuch as the whole matter is this: The miners receive \$4 per day; the mine owners say the miners cannot pay this sum, and he worked at any profit; the miners refuse to take less; the mine owners refused to pay more than \$3.50, and the mine shut down. The Silver Reef Miner says: "On Tuesday morning, the 1st inst., upon the miners going to the Buckeye mine, of the Stormont company, they were met by Supt. Allen, who informed them that all men going into the mine had to work for \$3.50 per day. Upon learning this, the men went back to town, dressed themselves, and then marched down to the mine in a body, and ordered every man working in it to come on top. These men then joined the crowd, and all proceeded to the Savage shaft; and the men working there also came out of the shaft, and fell in line. They then very orderly and quietly marched to the Berbee & Walker mine, and told the miners to come on top, which they did, and also fell in line. The Barbee & Walker company were given until noon Wednesday to clean up their mill, and then shut her down. The crowd then marched over to town." The Berbee & Walker made a draft of about 30 men on the 1st inst. Dead work has ceased, and all the men now employed are working in ore. The mill is running as usual. The Miners' Union intend fighting out the question on the \$4 line. The principal mine of the Stormont company has been shut down, the pumps hoisted out, and before long the mine must be flooded. If no amicable compromise can be effected before the workings are submerged, the Buckeye will probably be a ruined mine.

It is understood that the three companies, Stormont, Christy and Barbee & Walker, have contemplated this reduction some time, owing to the fact that miners' wages are higher in the camp than at any other in Utah. They claim there is no reason for this, as living is cheap, mines dry and easy to work, and climates healthy. They wanted to reduce to \$3.50 for underground, and \$3 for surface work. The Christy, as we understand it, was in the plan to reduce wages, but the Superintendent did not close his mine, having come out as a \$4 man when the troubles began. The other two companies are now making the fight. The arguments used by the mine owners are that the ores of the district will no longer stand these wages and they cannot pay more than expenses to run the mines. The miners, of course, deny this, and say that they will stick to \$4 per day, or not work at all. The Miners' Union comprises some 300 men—all the miners there are in the camp.

## Map of an Important Mining Region.

We publish in this number of the PRESS a lengthy article on the country traversed by the Carson and Colorado railroad, illustrating the same with a map showing the location of the principal mining districts, towns and other localities in that region. The map is a "sketchy" one, and has no pretence of being strictly accurate, but will serve to show the relative positions of the various parts. The table of distances, on the whole, however, will be found accurate.

The section of country covered by this map comprises some 30,000 square miles situated adjacent to the line of the railroad, and extending from 60 to 80 miles on either side of the boundary line between the States of California and Nevada.

It is known to be rich in almost every form of mineral and metallic wealth, but little of which could heretofore be turned to profitable account, owing to the great cost of freights, all of which had to be transported on wagons and pack animals, and generally over long stretches of barren and sandy country. It was for packing over some of the routes extending into this region that camels were at one time used, these animals having been employed for bringing out salt from some of the many salines existing there.

Through the construction of this railroad the carriage of goods is likely to be so cheapened as to give a great impetus to mining off that way, the business having already sensibly improved in anticipation of the benefit to be derived from railroad transportation. The map presented, while it makes but a meager topographical display, and claims to be only approximately correct, will, in connection with the table of distances given, be of service to parties visiting, or especially interested in that section of country, touching which, this class of data is very incomplete, and often inaccurate.

The Antioch Ledger says that the owners of the Empire railroad, who have bought the well-known Central mine, will immediately commence the construction of a railroad connecting the Central with the Empire. The road will cross three other and intervening claims, namely, the Pioche, Hartshorne and Corcoran, through all of which the coal measures extend. Work will be commenced in the Central in a few weeks, and a new mining town will spring up similar to Judonville and Somersville.

## Legislative.

The principal topic of interest discussed by the Legislature during the past week has been the Debris Act repeal question. After much discussion and exhaustive argument the repeal bill passed the Senate on Tuesday by the vote of 32 to 8. Motion to reconsider was given and next day reconsideration was refused by a vote of 27 to 12.

This bill to establish and support a Bureau of Land and Labor Statistics was discussed at length on second reading. The author of this measure, Senator Enos, made a vigorous speech, citing the establishment of such a bureau in the Eastern States, and the good results therefrom. He said 40,000 laboring men of California demanded the enactment of the law.

The committee on corporations has reported adversely on Assembly bill No. 93, (which we have previously given) regulating the buying and selling of stocks on margin.

On motion of Kellogg, the resolution asking Congress for relief for settlers on mineral lands on the 16th and 36th sections, was taken up and adopted in the Assembly. This bill we have previously given.

The Committee on Public Buildings reported in favor of the passage of the bill compelling all public buildings to have doors swing outward.

Senator Wasson, of the Committee on mines and mining, reported adversely to bill No. 81, relative to amending the mining law. This bill related to the formation of mining districts and to the arrangement of mining laws in the California code.

The Senate Committee on Water Rights and Drainage met Monday evening, and considered Harlan's bill relative to hydraulic mining and stopping the debris. One bill, making it a misdemeanor for any miner to run his debris upon agricultural land, was reported unfavorably. Another, and the most important of all, was to permit plaintiff, in actions for damage against miners, to join, or, in other words, show damages in severalty. This bill it was agreed to report favorably. Harlan's bill to abolish the office of State Engineer was considered, and after amendment, so as to abolish the office after July, 1881, it was agreed to report it for passage.

Assembly bill No. 295, by Mr. O'Connor, relates to mechanics' liens. Any person or firm, mechanic, material man, artisan, or laborer, who may bestow labor, or furnish material, fixtures, or tools to erect any house, improvement, or to repair any building or improvement whatever, to have a lien on such house, etc., and also on the lot or lots, or land, necessarily connected therewith, or on the leasehold interest, to secure payment for labor done, etc. To fix and secure the lien this person to have the right at any time within—after this debt becomes due, to file his contract, if in writing, with this Recorder, to be recorded by the Recorder. If the contract, order, or agreement be oral, a duplicate copy of the bill of items shall be made, under oath, one to the Recorder and the other to the debtor. Both the contracts and accounts, when filed and recorded, shall be accompanied by a description of the lands, lots, houses and improvements, etc. When such contract or account is filed and recorded, it shall be deemed sufficient diligence to secure the lien herein provided. Fee for filing 50 cts. The lien to extend to the land designated, and the person enforcing the same may have the lot or lots and improvements sold together, or he may have the improvements separately sold.

## The State Mining Bureau.

Two bills which relate to the State Mining Bureau, both introduced by Mr. Wasson, are now pending before the Legislature. These sections of the first bill, as amended, are as follows:

SECTION 1. On a written demand of the State Mineralogist, the State Librarian is hereby authorized and directed to deliver to him the cabinet of minerals, with all the fixtures thereto belonging and appertaining, now in the State Library; and the Secretary of the Board of Regents of the University of California, or any authorized officer thereof, shall, in like manner, deliver all of the engraving, camping, and other instruments and utensils and material, not used or needed by the State University, the property of the State Geological Survey, and which was placed in the University for safe keeping.

Sec. 2. A sum not exceeding \$150 is hereby appropriated, under the superintendence of the State Mineralogist, for the purpose of defraying the expense of removal of said property to the Mineralogical Museum, in the City of San Francisco.

The other bill appropriates \$10,000 for two years, as the following section shows:

SECTION 1. For the purpose of increasing the efficiency of the State Mining Bureau, and in order that the legitimate mining interests of every character in the State may be to a greater extent understood, fostered, and encouraged, the sum of ten thousand dollars (\$10,000) for each of the years 1881 and 1882, is hereby appropriated and set aside, out of any moneys in the general fund not otherwise appropriated, to the "Mining Bureau Fund," created by an act of the Legislature of the State, approved April 16th, 1880, entitled "An act to provide for the establishment and maintenance of a Mining Bureau." All amounts to be paid out of said fund shall first be allowed and audited by the State Board of Examiners.



## The Carson and Colorado Railroad.

## Mining Districts and Mineral Regions on the Line.

(Written for the PRESS.)

The extension of the Carson and Colorado Railroad into the country lying to the southeast of this place imparts to that region an interest and a prospective consequence that have not heretofore attached to it. As this is a country of "magnificent distances," its towns, mining camps, and other noteworthy localities being far apart, and not always laid down accurately on the maps, I have prepared and send you herewith some tables giving bearings and distances between many of these localities and a few central points. [See map on this page, EDS PRESS.] The data for these tables having been collected in good part during a trip recently made through that country, the same will, I think, be found tolerably accurate, the whole sufficiently so for most ordinary purposes. The places from which these courses and distances have been calculated are Carson City, Bodie, Aurora, and Columbus; each central to a number of mining towns, districts, or other important points, the distances being estimated along the roads and trails usually traveled.

## From Carson City to

Localities.	Miles.	Courses.
Genoa.....	45	S
Silver Mountain.....	45	S
Wellington's Station.....	50	SE
Pine Grove.....	75	SE
Walker Lake.....	85	KSE
Cambridge.....	80	SE
Bodie.....	117	SSE
Aurora (Esmeralda).....	105	SSE
Belleville.....	150	SE
Candelaria.....	158	SE
Columbus.....	165	SE

## From Bodie to

Aurora.....	12	ENE
Mono Lake.....	10	S
Bridgeport.....	14	NW
Castle Peak.....	25	W
Mountain View.....	40	SW
North Fork.....	45	SW
Minaret.....	55	SW
Buckeye.....	20	W
Tioga.....	35	W
Homer.....	38	WSW
Prescott.....	40	WSW
Lake.....	50	S
Laurel.....	53	SSE
Deep Wells.....	13	SSE

## From Aurora to

Pine Grove.....	24	NNW
Cambridge.....	18	NNW
Walker Lake (south end).....	40	NNE
Belleville.....	60	ESE
Columbus.....	75	ESE
Benton.....	42	SSE
Indian.....	45	S
Bishop Creek.....	75	SSE
Independence.....	120	S
Cerro Gordo.....	160	SSE
Darwin.....	180	SSE

## From Columbus to

Candelaria.....	7	W
Belleville.....	15	W
Black Mountain.....	25	W
Marietta.....	30	W
Excelsior.....	23	NW
Clarendon.....	25	NW
Silver Star.....	32	NW
Walker Lake (south end).....	47	NW
Santa Fe (formerly Volcano).....	40	N
Glille Mountain.....	30	NW
Grantsville (Alexander mine).....	68	NNE
San Antonio.....	65	NNE
Montezuma.....	45	ESE
Silver Peak.....	47	ESE
Lyda Valley.....	60	SE
Gold Mountain.....	75	SE
Fish Lake Valley.....	18	S
Sylvania.....	40	S
Indian Queen.....	25	SW

## Mining Districts Tributary to the New Railroad.

To describe, with any fullness, the various mining districts that have, in times past, been organized throughout the extensive region that will afford more or less sustenance to the Carson and Colorado Railroad, would require many columns of the *Press*. Even a bare enumeration of them would make a long list, not much less than a hundred having been organized first and last. Not in all cases, however, have these districts been maintained. Many of them, fully a third, perhaps, have been deserted and suffered to fall into disuse, not having long survived the excitement that gave them birth. In numbers of them, even where an organization has been kept up, so little has been done that further mention of them may here be omitted, a few general remarks on some of the more important being all that can now be undertaken.

## The Bodie District.

As being the most lively, populous, and largely productive of these mining camps, first claims our attention, though even of this we shall not be able to speak with much detail. The town of Bodie has been for the past year, and still is, suffering from the reaction consequent upon the excitement that attended its earlier history, and the effects of which are now visible in every interest and branch of business connected with the place. Real estate has much depreciated in value, and the number of inhabitants having greatly diminished, the trade of the merchants and the patronage of the hotels, lodging houses, restaurants, and other minor callings, has fallen off in a like ratio. This, while it works a present hardship to those engaged in these pursuits, is, after all, a healthful process, being merely a sloughing, as it were, of the superfluous popu-

lation—an effort of business to adjust itself to a normal condition, and which, when effected, will make it better for all. Mining, the underlying industry over there, though less active than formerly, has not experienced the depression suffered by most other vocations.

Summarizing a little in this department, it may be observed that nearly all the larger companies at Bodie, say to the number of twenty or more, are employing about their usual labor force, the reductions made being mostly with the smaller companies, the majority of whom are also doing more or less work. All the stamps in the districts, about 160, have been kept running thus far, and ordinary interruptions excepted, are likely to be kept busy for the balance of the winter, fuel and ore having, as a general thing, been provided for. Even though no additions be made to the crushing capacity of the district, nor any new bodies of extra high grade ore be discovered, the gold product of Bodie for the current year ought to exceed two and a half million dollars, of which one-third, at least, will be paid out on labor account. While, taken as a whole, the value of the ledges in this district were at one time greatly overrated, still it must be conceded that there have been developed there some of the most sterling mines in the State, with the chances that others of large and possibly equal value will yet be opened up.

## Of the Mining Districts Located Around Bodie.

And to which it may be considered a sort of center, as denoted in the preceding tables, being nearly all comparatively new, not much can be said, as, indeed, not much can be expected of them, either in the way of hullion production

near it, and which being central to the entire group of mines in the district is in name often confounded with the latter. Both, after a short but prosperous career, went into a decline many years ago and from which they have only latterly shown any signs of recovery. Within the past year or two, owing chiefly to a well-planned and determined effort on the part of certain capitalists to prosecute deep explorations on one of the mines in the district, confidence in the resources of the latter has been measurably restored, leading to additional prospecting being done by other parties and causing some improvement in the business of the town. The exploratory work alluded to consists of a vertical shaft of large size, which, commenced several years ago on the Real Del Monte grounds, has now reached a depth of 700 ft., at which level the prospects, according to all accounts, are of a very flattering kind. A tunnel is being driven to thoroughly open up the Prospectus mine, in which a large body of good ore has already been cut. These, with some other ore developments of recent date, have tended to arouse the old residents of Aurora and stimulate them to engage in a more extended and methodical style of ore search than had for a long time been in vogue; their labors for many years before having been confined to pirouetting around through the old shafts and drifts after such small hunches of rich ore as had been overlooked, and which, when got at, they managed to crush in some of the dilapidated mills, or more often in hand mortars; and in this manner they managed to get money enough to live along from hand to mouth. Under the new order of things the earnings of these people, if not larger, will be apt to be more steady and cer-

fuel and water, both of which have still to be brought from a long distance—the fuel from the sparsely wooded mountains from five to 10 miles away, and the water through iron pipes from a spring lying 12 miles to the west. The ore is rebellious and has to be roasted, after which it yields up about 90% of the silver it contains—it carries no gold. There are a great many ledges in the Columbus district, some of which, as for example the Mt. Diablo, Metallic, etc., have been extensively opened, and will no doubt after a while become profitably producing mines, there being here at the same time, as in every other district, many claims that will never amount to much. While the mining district of Columbus is so tolerably prosperous the town itself is dull, most of the business once done there having been transferred to Belleville and Candelaria, the latter situated nearer the principal mines. The old town receives, however, considerable support from the farmers of Fish Lake valley and the teamsters who haul freight to the mining camps lying off to the south and east. Of the many

## Mining Districts Situated Within a Radius of 60 or 70 miles of Columbus.

Only a few of the more important can at this writing be noticed. Concerning those lying off to the north and northwest, it may be remarked that the most of them were organized many years ago, but being in a dry and barren region of country, and the claim-holders being men of small means, but little work has been done in any of these districts, though the most of them show good evidence of valuable ore deposits. They contain now but a small population and, with the exception of two or three small and poorly equipped mills, are without reduction works.

Looking to the south and southwest we come first to the Black Mountain district, lying 14 miles beyond Belleville, site of the Eadown mine, which a few years ago was worked with success, but has latterly been idle. The company have a 5-stamp mill at the little town of Marietta, three and a half miles from their mine, but the mill, like the town and the mine, has come to a standstill, the place and the property, with the country around, presenting a thriftless and forlorn appearance. The several mines farther on to the southwest, around the hamlet of Partwick, are doing, as they for many years have done, moderately well—small quantities of rich, sthborn ores, from which careful treatment wrings a fair percentage of the precious metals. Twenty-five miles southwest of Columbus, and 15 east of Benton is situated

## The Indian Queen Mine.

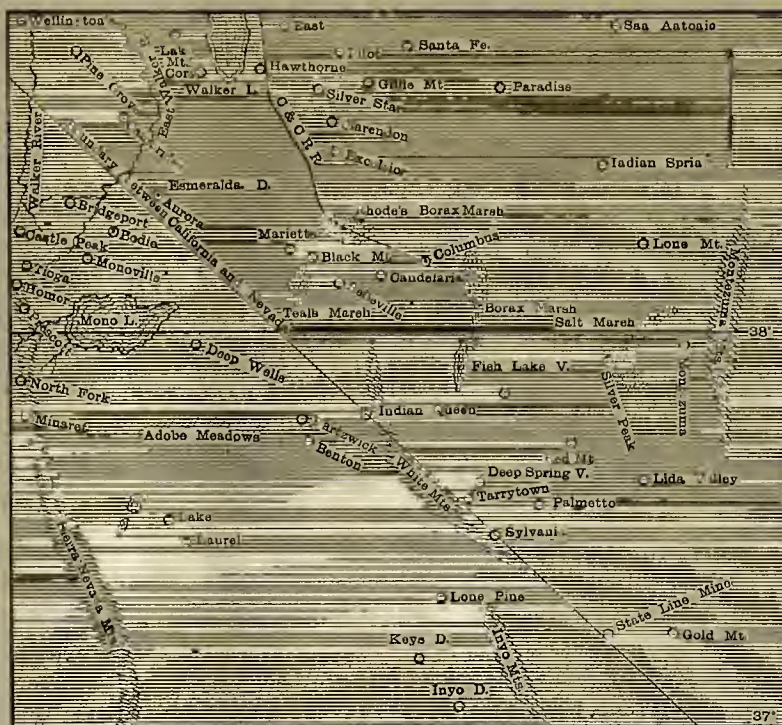
Outfitted with a 5-stamp mill and an improved Howell roasting furnace. The ore here, though rich—pulp assays averaging about \$130 per ton—are base to a degree that renders them extremely intractable. A viler combination of metals and minerals than this ore contains it would be difficult to find; yet, so thoroughly is it desulphurized and chloridized through the use of this apparatus that 95% of the silver is readily extracted from the pulp by pan amalgamation. This furnace, which consists of a conical cylinder, self-feeding and set on an incline, is the invention of John Howell, a miner of long experience and a metallurgist of great practical skill, and under whose general supervision the Indian Queen mine has been engineered to a marked success. With only a 5-stamp mill this property is yielding at the rate of nearly \$100,000 per year, its total product to date having been not much less than a million dollars, on which the net profits have been exceptionally large. The mine, which is located in a sag on the westerly slope of the White mountains, at an elevation of over 10,000 ft., is opened and worked by a series of five tunnels run in and with the lode, and which, being the one above the other, have afforded facilities for cheap ore extraction, and thorough drainage. The ledge, though small, is exceedingly rich and occupying a true fissure is likely to prove permanent. The reserves at a depth of 400 ft., are large and carry a higher grade ore than at any point above. But the mine itself is not better than hundreds of others in that region, its great success, achieved under many difficulties, having been mainly due to the employment of the Howell roaster and a generally good management.

Crossing the White mountains and traveling southeast a distance of 35 miles, passing on our route through Deep Spring valley, where there is water and some good land with undeveloped quartz lodes all round, we come to

## The Sylvania District.

Also abounding with metalliferous veins from four to ten ft. wide and well charged with ores carrying silver, lead, antimony, etc. Many shafts, 20 to 100 ft. in depth, have been sunk here and some ore taken out. A lot of it was sent to the Indian Queen mill and there worked by John Howell, who returned \$170 per ton, being over 80% of the silver it contained. Though considerably vitiated with antimony, arsenic, etc., it is a good smelting ore, containing itself all the requisite fluxes. And by this method it will most likely be treated hereafter, as the district is pretty well supplied with wood and water, though thus far without reduction works of any kind. Proceeding in the same direction as before, 20 miles bring us to Gold Mountain, a district formed many years ago and in which about 100 claims have been located and a considerable amount of work done. A 10-stamp mill was put up here at an early day, but the

[CONTINUED ON PAGE 112.]



MAP OF MINERAL REGION NEAR LINE OF CARSON &amp; COLORADO R. R.

or development. In a mineral belt lying to the westward of the town, and stretching in a northerly and southerly direction for a distance of fifty or sixty miles, a great number of gold and silver bearing lodes have been discovered within the past few years, which led to the organization of the following mining districts along it, viz.: The Castle Peak, Mountain View, Tioga, Homer, Prescott, Buckeye, North Fork and Minaret; some of which lie along the easterly slope, and others quite on the summit of the Sierra Nevada. Touching the mineral deposits in these districts it may be said that many of them are highly spoken of by the miners who have been at work upon them, a few, also, having been favorably reported upon by experts sent to examine them. Not much work, however, has yet been done upon any of the ledges there, leaving their absolute value to be demonstrated. As the winters are long and the snow falls to a great depth in that region, not till suitable buildings are erected and explorations are so advanced that the miners can labor under cover can much effective work be done. As wood and water are, however, abundant there, ore reduction can be performed cheaply should there be necessity for prosecuting the business on a large scale.

The Mammoth mine, Lake District, having failed to verify the favorable predictions made concerning it several years ago, albeit a great deal of money has since been expended in equipping and working it, this district, in common with the two or three others lying near it, has suffered in its prestige as well as in its more vital interests. Owing to this and other untoward causes, a general dullness pervades the Laurel and other districts in the vicinity of Lake.

## Esmeralda and Aurora

In their local significance mean about the same thing; the former being the name of a mining district and the latter of the only town in or

tain. Though still a little murky, the clouds are beginning to lift over there about Esmeralda.

## Cambridge and Pine Grove.

In the Cambridge, formerly called the Washington, and still earlier the Salt Spring district, situated on the East Walker river, ex-Governor Blasdel, who owns most of the mines there, is running a 10-stamp mill on the gold-bearing quartz which several of the lodes yield of good quality and in considerable quantity. Mining is there supplemented by farming, some 200 acres of land under careful irrigation being made to produce good crops of grain, alfalfa, etc. At Pine Grove, six miles northwest of Cambridge, one, and sometimes two of the several mills formerly put up there is kept running steadily, the annual hullion product of the place being about \$100,000 in gold. The district, which was organized in 1867 and a considerable town built up soon after, has been kept back by a variety of causes, some of which a fair display of energy ought to have overcome. A good deal of prospecting is going on and some work being done, and, taken altogether, the outlook for the district and neighborhood is tolerably good.

## Columbus and Surroundings.

Coming to Columbus we enter a broad field, it being the center of a metal-bearing territory rich and varied in its resources and imperial in extent. From the mines lying in the immediate vicinity not less than \$15,000,000 have been extracted, their yield for some years past having been over \$1,000,000 per annum. Among these the largest producer has been and still is the Northern Belle, which, whether assured of a long life lease or not, would seem to possess a good deal of present vitality. The mine is well developed and said to show a good stock of \$100-ore. The two large mills of the company are located at Belleville, eight miles west of the mine, placed there for greater convenience to



### The Floods and the Debris.

The Grass Valley Union says: The recent extraordinary storm has made a flood of water in the valley only second to the great overflow of 1861-2, which caused widespread devastation. The levees have broken in many places, and large areas of land have been flooded, which will result in great loss and inconvenience to those who hoped that they were protected by the embankments which had been constructed with so much labor and expense. This flood is already being used by the anti-debris men as a weapon to fight hydraulic mining, as they assume without the mining debris in the bed of the streams, the flood would have been borne in the channels and the levees would have remained intact. It would probably be useless to attempt to convince these men, who are disposed to hold the miners responsible for the phenomena of nature, that the extraordinary downpour of water from the precipitous watersheds of the Sierra Nevadas is something that can hardly be brought under the control of human efforts, but yet it is our privilege to point out that in the great flood of '61-2, when there was comparatively little debris in the river beds, the overflow of the valley was sufficient to extend the water from the foothills of the Sierras to that of the Coast Range. The water that poured into the valley was in an amount that no river channel could contain, and no levees could be reared high enough to hold. Then as now the water did as much damage from streams that descended from the non-mining regions, as that which went down from the auriferous hills of the Sierras, Putah and Cache creeks and numerous other streams that have their sources in the Coast Range, where no mining exists, sent out as destructive floods upon the valley as came from any other quarter. And so, too, at the present time, the Napa valley, which has no connection with any river system upon which mining is done, has been flooded to an unexampled extent, and great damage to property has resulted. The experience of the oldest settlers and flood-marks of perhaps a century ago go to prove that the valley of the Sacramento has been subject to flood visitations that made it a great inland sea, where its rivers would be currents in the wide waste of water. While the filling up of the river beds on this side of the valley, by mining debris, is an acknowledged fact, it cannot, in truth, be charged that that filling is responsible for the water breaking the levees below and flooding a large extent of country. The miners do not control the storms, neither have they builded the lofty Sierras, which sends the contents of the storm-clouds like an avalanche upon the low country. It is weak and querulous to ascribe to human agency that which is alone attributable to the forces of nature, and beyond human control.

**MOVEMENTS OF RAILROAD TRAINS.**—It is announced that in a few days the overland train will leave this city at 8 o'clock instead of 9:30, as at present. The 4 o'clock train will leave as usual for Los Angeles and Arizona. The 4:30 train will go by Niles, Livermore and Pleasanton, overtaking the Los Angeles train at Lathrop, and reaching Sacramento at 10 o'clock. The 7:30 train will go to Vallejo, Woodland and Willows. The noon train from Sacramento has been abandoned. The overland will arrive here from 1:15 to 1:20 P. M. The last train in the evening will arrive about 9:30 P. M. It is probable that the overland train will go via Stockton for about two or three months.

**PACIFIC ROLLING MILL.**—At the annual meeting of the stockholders of the Pacific Rolling Mill Company, the following gentlemen were elected directors for the ensuing year: D. O. Mills, William Alvord, Louis McLane, Nicholas Luning and James G. Fair. Subsequently the following officers were elected: President, William Alvord; General Manager, L. B. Benchley; Superintendent, Patrick Noble; Secretary, C. M. Keeney.

### Business Directory.

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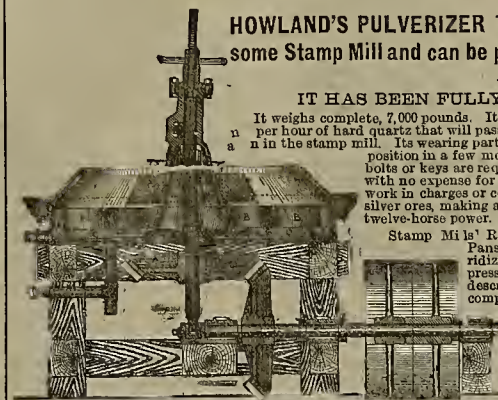
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### Mining Books.

Orders for Mining and Scientific Books in general will be supplied through this office at published rates

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### A Card from Architects.

**The California Architect and Building Review.**

Office, No. 240 Montgomery Street, San Francisco, Cal.

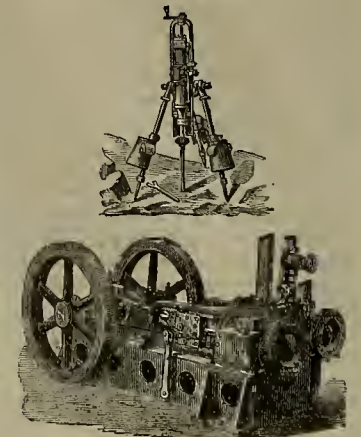
It is with pleasure that we publish the following from prominent Architects in this city: Believing that a journal of this kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally, and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Farquharson, Wright & Sanders, S. H. Williams, Thos. J. Welsh, P. Huernie, John Marquis, B. McDougal & Son, Wm. Mosser, Wm. Curlett, Meeker & Banks, W. C. Hoagland, S. J. Newsom, B. Hendrickson

**New Book on the Comstock.**

The attention of MINING ENGINEERS and EXPERTS is called to the new work by JOHN A. CHURCH, E. M. PH. D., on "The Comstock Lode, Its Formation and History." This very exhaustive treatise on this famous lode is fully illustrated with diagrams and colored charts showing sections, ore bodies, etc., and will be of great interest and permanent value for reference. DEWEY & Co., Publishers of the MINING AND SCIENTIFIC PRESS, are sole agents for the sale of the work. Mr. E. M. SLEATOR will act as their agent, and call on Mining Engineers and those interested in the great lode in this city with a copy of the book for their inspection.

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# PATENTS AND INVENTIONS.

## List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING JANUARY 4TH, 1881.

236,133—DREDGING BUCKET—J. A. Ball, Oakland, Cal.  
 246,207.—NAPKIN RING—Geo. H. Behan, S. F.  
 236,306.—FRUIT BOX—R. J. & M. Cooke, Sacramento, Cal.  
 236,154.—WAGON JACK, E. S. Gerow—Cordelia, Cal.  
 236,320.—ARITHMETICAL FRAME—F. B. Ginn.  
 236,338.—ORE CRUSHER—F. A. Huntington, S. F.  
 236,168.—INKING-PAD CASE AND STAMP RACK—C. A. Klinkner, S. F.  
 236,171.—COLLAR BUTTON—R. Matthal, S. F.  
 236,243.—MOVABLE DAM—J. D. Osterhout; San Bernardino, Cal.  
 236,251.—REFINING APPARATUS—P. Percy, S. F.  
 236,353.—HAY PRESS—T. Phares, Eureka, Cal.  
 236,356.—TANK STRAP—E. Pomeroy, San Jose, Cal.  
 236,179.—OFFICE DESK—I. B. Robbins, Stockton, Cal.  
 236,182.—THRUSHING MACHINE—G. W. Schenck, S. F.  
 236,183.—CIGAR-LIGHTING LAMP—W. R. H. Scheunert, Sacramento, Cal.  
 236,274.—BARKING APPARATUS FOR FURNACES—J. O. Stewart, Alameda, Cal.  
 236,277.—WINDMILL—W. O. Swinnerton & E. B. Saunders, San Jose, Cal.  
 236,282.—LEVEL—W. W. Vaughn, Stockton, Cal.

## Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**FLOW.**—C. Grattan, Stockton, Cal. The object of this invention is to provide a number of shallow-cutting plows, which shall work over a large surface at each passage of the machine, and which will pulverize the top of the ground and keep it in a moist condition, so that when large plows are used for deep summer fallowing, the ground will turn up in a finely pulverized condition throughout, instead of being in large, hard lumps, as would be the case when large plows are put into unbroken soil. This plow is specially adapted for plowing in seed; and on account of its large size and consequent rapidity of its work, time may be given for the weeds to appear after the early rains before the seed is put in, as the plow will cut down all these weeds.

**TAP AND FAUCET.**—E. H. Crow, San Francisco. This invention relates to a tap and faucet for casks, kegs, barrels and other receptacles for liquids, the construction of which will permit the faucet to be easily removed, and can be used in any cask or keg in which the tap is placed. No hammering is required. The faucet fits easily and can be readily removed, while the hushing and sleeve snap the wood plug, and form a permanent and efficient method of closing the opening.

**HOOP IRON.**—The Cleveland Rolling Mill Company, Union Steel Screw Company and upwards of 40 other companies, firms and individuals prominently identified with iron interests here, have signed a memorial to be forwarded to General Garfield, setting forth that the late decisions of the Secretary of the Treasury are affecting seriously, if not utterly destroying the manufacture of hoop iron in the United States; and another decision now pending, as to the duty on tank or plate iron, is of like importance.

**NOT ENTIRELY PLAYED OUT.**—The attention of the *Rocky Mountain Mining Review* is called to the fact that Virginia City is still in existence. Mines are still being worked, mills are still running, and the camp is not completely wiped out, as we would infer from reading its editorials on the subject of late. Those "formerly famous bonanza mines" of which it speaks are still turning out two or three millions of dollars a year, and it is only from their comparatively greater productiveness that the amount seems small.

**BODIE BULLION.**—The following amounts of bullion were shipped from Bodie during the month of January, by the several mining companies named: Standard, \$185,645.70; Bodie, \$33,715.34; Noonday, \$26,355.75; Syndicate, \$16,712.11; Banks, etc., \$13,261; total, \$275,689.90.

In the hill northeast of the Lower Sink of the Carson river, Nevada, are some large veins of yellow ochre. It is pure and bright, and when burned makes a red almost as fine as vermilion. For ages the Indians have burned this ochre and use it for adorning their faces. In the same hill are strata of earth closely resembling umber.

In cost Sandy Bowers \$240,000 to erect the building now known as the "Bowers Mansion," in Washoe valley, Nev., and the furniture, books, pictures, etc., \$45,000 additional. The walls of the building are of blocks of the hardest granite.

THERE are 15 mines in Bodie district with steam hoisting works on which no work is being done. A number of them will be started up at an early day.

THE wagon bearing a 30,000 lb. steam cylinder for the Lent shaft, at Bodie, upset at Matthews' ranch, and the cylinder now lies buried in the mud.

## The Carson and Colorado Railroad.

[CONTINUED FROM PAGE 105.]

remoteness of the locality and a general scarcity of water have retarded developments, notwithstanding the mineral wealth of the district is known to be great. At last some new life seems likely to be infused into the place. A New York company, having purchased what is known as

### The State Line Mine,

Are about to erect thereon a large mill and to work the property in a vigorous and systematic manner. This mine, as its name might be supposed to suggest, lies partly in California and partly in Nevada, about one-third of the Gold Mountain District being on the California side of the boundary between these two States. On the claim, which is an extensive one, a good deal of work has been done and a considerable quantity of ore taken out. But this availed little, there being no mill in the district to work this ore and the former owners of the mine not being able themselves to put up one. And so the property, though evidently a good one, remained for years unproductive and practically valueless. Under the new ownership all this will be changed. Possessing ample means the present proprietors have planned and will conduct everything on a large scale. To this end I. M. Taylor, an experienced miner and millman, himself part owner of the property, has been put in charge in the field. It is a good selection, Taylor, as regards energy and sound business judgment, having no superior among the mine capitalists of the coast. The machinery for the new mill, which is to be of large capacity and first-class in all its appointments, is now being built in San Francisco; this, through a New York Company well appreciating the advantages of giving the work to establishments on the Pacific side. Meantime, the work goes on actively at the mine. Ore extraction is being diligently pushed; wood is being cut and piled up to dry, preparatory to be hauled to the mill; 12 miles of iron pipe is being laid down, that being the length required to bring water from an amply supplying spring upon the premises. What, with money paid out for labor, machinery supplies, etc., the expenditures of the company will amount to a large sum; and the number of employees, now considerable, will be much augmented when the mill comes to start up. Though commencing with 40 stamps, this number will be increased largely hereafter; it being the purpose of the new company to work their mine for all it is worth. It is even said that they are ambitious of emulating the great Black Hill mills as regards the number of stamps to be run. Touching bullion production they will hardly be satisfied with less than four times as much gold per ton of ore worked as the best Dakota mines turn out. The ore in the State Line mine, a quartz, bearing free gold, milling from \$33 to 35 per ton, stands in a solid, shapely mass nearly 30 ft across, and as the gangue, the walls and the country are all that could be desired, an early exhaustion of the stock here would imply a reversal of established geological laws, a thing not expected to occur in nature. The enterprise will be a success, and do much good by inducing other capitalists to embark their means in a region of country, which, though long neglected, possesses mineral resources second to no other in the State.

### Palmetto, Lyda Valley and Silver Peak

Leaving Gold Mountain and coming north we may, by slightly deflecting our course to the west, pass through the Palmetto district, with plenty of argentiferous lodes, but no reduction works and nothing done, and thence come on to Lyda valley, where the above remark might in part be repeated, the ledges here being even more numerous than at Palmetto, and the ores generally of a better grade and a more varied character, carrying gold as well as silver and lead. As the settlers in Lyda valley have enjoyed the further advantage of some small mills and furnaces, enabling them to reduce a portion of their ores, they have escaped the financial stringency experienced by most of their neighbors; yet even here mining lags, the district, despite a good deal done in a small way, being far from prosperous. What is required is capital to make the resources of the district available, these being ample for the profitable employment of large sums, now that a railroad is approaching and will, very likely, in the course of another year, traverse this group of mining districts. As capitalists have lately interested themselves at Gold Mountain and Montezuma, so might some of this class find it worth while to pay a little attention to Lyda valley and other of the districts previously spoken of.

A 20-mile stretch N. W. across Clayton valley brings the traveler to Silver Peak, which has an industrial history not at all cheerful, and which we cannot here stop to relate; suffice it to say, the disasters that overtook the extensive enterprise inaugurated there some 15 years ago, with its building of mills and heavy expenditure of money, were mainly due to mismanagement, culpable or otherwise. Many of the mines there are good—good enough to have warranted all that has ever been done in their behalf, had it been done well. It is said that the property has lately passed into the hands of partisans who will soon resume operations upon it, and under auspices that promise better results than attended its former working. Let us hope it will so prove.

Standing at Silver Peak and looking east, a heavy range of mountains, dark with pinyon forests and verdant with pasturage, lifts itself to the height of 3,000 ft. above the intervening

salt marsh, shutting out the view in that direction. These are the Montezuma mountains, and a right pleasant sight they are, with so much grass and wood in this arid and timberless land. And a pleasant history is connected with them too, for here, covering the southern extremity of the land, is the site of

### The Montezuma Mining District,

A locality that has brought profit to many and loss to none; the mines there since their discovery in 1863 having been not only self-sustaining, but remunerative to all concerned. For the first few years the ore was taken to Austin, 145 miles, at a cost, hauling and reduction included, approximating \$200 per ton. The ore so disposed of averaged \$400 per ton, the higher grades only having been selected. Then Dawley and McGlew took in a 10-stamp mill under a contract to convey, when the structure was set up and completed, a one-half interest in it for 900 ft. of mining ground. Though this mill cost a large sum, the contract was fulfilled on the part of the men, who even then made money in the end. The ore here, always impure, becoming at last so base as to require roasting, a Howells furnace was procured and the difficulty for a time obviated. With increasing depth the greater proportion of the ore has now become so laded that it can be reduced to advantage by smelting, only. To meet this new want.

### A Smelting Furnace,

Of large capacity, is now being set up at a point convenient to the mines, and which will soon be ready for operations. While a single furnace will do to start with, another and perhaps several will ultimately be required as this ore is very abundant in the district. It is also of good average grade, carrying from 20 to 30 per cent. lead and about \$60 in silver, to the ton. The principal group of mines in the district together with about all the available water and a large tract of timber, is owned by a single company, mostly Boston capitalists, with the business office in that city. The management on the ground has been committed to John Howell, a thoroughly capable man and inventor of the furnace before alluded to. Of these mines, which number twenty or more, fully one-half are pretty well opened, several of them being very thoroughly explored and outfitted with hoisting works. As extensive bodies of ore of the kind above described have been developed, an immediate, large and well sustained production of bullion may be expected to follow the completion of the smelter now under way. This method of treating the argentiferous galenas at Montezuma, has long been contemplated but has been postponed awaiting the advent of the railroad into that region, wagon transportation of base bullion over such long stretches of desert and sandy country having been too costly to warrant recourse to smelting at an earlier date. For the new enterprise, in such competent hands, a fortunate issue may safely be predicted. Both the mines and the new enterprise directed to a further utilization of their ores stand endorsed by one of our very ablest and most trustworthy mining engineers, who recently examined them with his accustomed impartiality and care.

### The Country Farther to the North and East.

Having said so much about the country lying adjacent to the route of the Carson & Colorado railroad, and which will, beyond any contingency, become tributary thereto, I refrain from remarking now upon a long line of mining districts situated farther to the north and east, and some of which will also be likely to afford that road material support. Beginning on the northwest, these districts consist of Elsworth, Union, Grantsville, (locality of the Alexander mine) all in the Sinkata valley, San Antonio, site of the Liberty mine, Belmont, Hot Creek and Tybo. Of these localities the three first named, including also, Belmont will be about aquidistant from Austin, terminus of the Nevada Central, and from the nearest point on the Carson & Colorado railroad, while Tybo and Hot Creek will occupy the same position relative to the latter, and Eureka, terminus of the Eureka and Palisade road. San Francisco freights destined to any of these districts would, however, if forwarded via Austin or Eureka, have to travel some 300 miles farther on the Central Pacific railroad than if stopping at Reno, they went in via the Virginia and Truckee and the Carson & Colorado roads. Beyond Tybo the latter road will take all the business throughout a belt of country 300 miles wide clear on to the Colorado.

Carson, Nev. Jan. 29th.

THE Tombstone *Nugget* congratulates the camp on the daily advent of capitalists and says: "Every day the stages from Benson come in loaded with passengers, and among them are a large number of capitalists who are here to see for themselves." When a rush of capitalists occurs it is just as well to see that some few of them at least are not the kind who hood a mine and borrow money enough from the owners to return to their principals with an order to report.

WE see the following in the *Mariposa Gazette*: A friend who resides near Hite's Cove on the South Fork, informs us that Hite's sand mill, situated about one-half mile below on the river from the main quartz crushing mill, together with the flume and tramway running thereto, have been washed away.

THE recent advance in lead is stimulating the low grade lead mines again.

## News in Brief.

RIPE oranges at Los Gatos.  
 THOMAS CARLYLE died last week.  
 BLOOMING almond trees at San Jose.  
 THE Basuto chiefs are inclined to sue for space. A \$350,000 fire occurred on Sunday in St. Louis.

LARGE fire this week on the Victoria docks, London.

DURING January, 8,076 immigrants arrived at New York.

A STRANGE epidemic is destroying the Reno (Nev.) hens.

IN St. Louis the State Senate killed the whipping-post bill.

KING KALAKUA left San Francisco on Tuesday for China.

LOCAL option petitions are being signed in San Luis Obispo.

A FRIEND of Harvard has given \$100,000 for a law school building.

MORE than half the taxes of Maricopa county A. T., are delinquent.

MORE Lancashire miners have struck. Many thousands are now out.

A NATIONAL MINING EXCHANGE has been opened at Philadelphia.

THE decrease in this public debt during January was \$7,382,167 1/2.

FRANCE has renewed a proposal for an International Silver Conference.

IT is intended to place the future Russian loan upon the American market.

THE Skuptschina resolved unanimously to close all the monasteries in Serbia.

WHEELER, the strangler, has been found guilty of murder in the first degree.

ONE THOUSAND millers at Runahon, Wales, have struck for an advance of wages.

DURING 1880, 261 buildings were erected in Portland, Or., costing nearly \$900,000.

THE Fall River spinners and weavers demand an increase of wages, or they will strike.

A STEAMER was wrecked on the Irish coast this week, and 39 persons were drowned.

ONE hundred and forty-eight deaths from small-pox occurred in New York Tuesday.

LAST year 2,700 tons of tanbark were peeled and shipped from the neighborhood of Lonsno, Santa Cruz county.

AN ENGLISH steamer, bound from Bilbao to Middleboro, has foundered at sea, and 13 persons were drowned.

AT Homer, Mono county, the cottonwoods and willows are budding out, and in some places blossoms have appeared.

A DESTRUCTIVE fire occurred at Ukiah, Mendocino county, on Tuesday. Supposed to be the work of an incendiary.

THE North Santiam's banks in Oregon are said to be lined in places with dead fish, dashed to death by the swift waters.

SITTING BULL's refuge is in Woody mountain, Canada, where there is no game. Crow King has surrounded with 315 warriors.

ST. PETERSBURG advises state that the war party in Peking collapsed on receiving intelligence of the capture of Gork Tepe.

J. O. SWIFT, of Utah, will build a large saw-mill at Wood River, Idaho, with a capacity of 15,000 ft. per day, early next spring.

THE new iron steamer, *Willamette*, built at Roach's yard, Chester, Pa., for the Oregon Steamship Company, was launched yesterday.

FOUR THOUSAND weavers are on strike at Hyde, near Manchester, England, for an advance of wages. Eleven thousand looms are idle.

IT is stated that Jay. Gould and R. T. Wilson have agreed to advance the Atlantic, Mississippi and Ohio railroad \$3,000,000 in return for half the stock.

DISPATCHES from stock-raising points in the west and southwest show little damage to herds by the severe weather. In Colorado the estimated loss is 10%.

A TREE has lately been cut by railroad loggers, near Olympia, W. T., that was 112 ft. without limbs, straight as an arrow and without knots or flaws.

THE Southern Pacific Coast Railroad Co. has over 800 men unemployed on the road between Santa Cruz and Oakland, and not a single Chinaman among them.

WM. H. VANDERBILT gave his check to Commodore Gorringe on Saturday for the total cost of the transfer of the Alexandria obelisk from the banks of the Nile to the banks of the Hudson.

THE connecting point between the Southern Pacific railroad and the Atchison, Topeka and Santa Fe railroads has been fixed at a point 11 miles west of Deming, N. M., and connections will be made March 10th.

THE recent storm in the Santa Cruz mountains and at Los Gatos has been the most severe ever known there. At Los Gatos the rainfall from Thursday until Sunday was 7 1/2 inches, and in the mountains back of that place, 15 inches.

THERE is considerable excitement in Chile, near the town of Canete, on account of large quantities of gold found by miners in old abandoned gold mines known as the Lefu mines. Gold is found in nuggets, some of which have weighed four, five and six ounces.

COL. TALMAGE, general manager of the Mission-Pacific railroad, says Jay Gould will add about 900 miles of new road to the Mission-Pacific system during the present year. The extensions will embrace about 450 miles in Missouri and Kansas, and equal mileage in Texas, carrying the system to the rice-growing land at Laredo.



Our Agents,

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send some hut worthy men.

J. F. OSBORN—San Francisco.  
A. C. KNOX—Pacific Coast.  
G. W. MCGRAW—Santa Clara county.  
M. P. OWEN—Santa Cruz County.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
N. E. BOYD—San Bernardino Co.  
JARED C. HOAG—California.  
R. W. CROWELL—Colusa and Yolo counties.  
D. W. KELLNER—Fresno, San Benito, Monterey and San Luis Obispo counties.

The Californian.

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

THE MINING AND SCIENTIFIC PRESS finished its 41st volume with its last publication. We do not know the circulation of the paper in this community, but we do know that every mechanic and miner ought to take it, for by so doing they would benefit themselves far more financially than they are aware of.—*Shasta Courier*.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and either binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So he signs and send us notice by letter.

Metals.

WEDNESDAY M., Feb. 9, 1881.

IRON.—		
American Pig, soft, ton.....	30 00	233 00
Scotch Pig, ton.....	25 00	228 00
American White Pig, ton.....	27 00	228 00
Oregon Pig, ton.....	—	—
Refined Bar.....	44 00	8
Horse Shoe, keg.....	7 00	28 00
Nail Rod.....	—	93
Norway, according to thickness.....	84 00	93
STEEL.—		
English Oast, lb.....	16 00	18
Black Diamond, ordinary size.....	13 00	15
Drill.....	9 00	10
Flat Bar.....	—	16
Flow Steel.....	9 00	10
COPPER.—		
Ingot.....	—	52
Sheet.....	—	20
Sheathing, Tinned 14x48.....	—	42
Nails.....	—	42
Bolts.....	38 00	42
Old.....	—	18
Bar.....	—	22
Precipitate, 100 lbs.....	18 00	19
LEAD.—		
Pig.....	42 00	5
Bar.....	—	6
Pipe.....	—	8
Pipe, Sheet.....	—	9
Shot, Discount 10% on 300 Bags.....	—	210
Drop, per bag.....	—	2
Buck.....	—	230
Chilled.....	—	250
T. PLATES.—		
10x14 I O Charcoal.....	—	210 50
10x14 I C Coke.....	10 00	210 00
Banca Tin.....	—	225 00
Australian.....	—	220 00
I. C. Charcoal, Roofing 14x20.....	20 00	210 00
ZINC.—		
By the Oast.....	—	10
Zinc Sheet 7x3 ft. 7 to 10, lb. less than cast.....	10 00	11
NAILS.—		
Assorted sizes.....	4 00	475

Lumber.

WEDNESDAY M., Feb. 9, 1881.

PINE AND REDWOOD.		
CARRO RATES.		
PINE.—		
Rough.....	16 00	20
Flooring & Step, No. 2.....	24 00	30
REDWOOD.—		
Rough.....	16 00	20
Surfaced.....	23 00	30
RETAIL RATES.		
PINE.—		
Rough.....	20 00	20

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, Feb. 9, 3 P. M.

SILVER.—  
GOLD BARS, \$200@210. SILVER BARS, 10@13 1/2 cent. in count.  
EXCHANGE on New York, 12 1/2 @ 15, on London bankers, 4 1/2 @ 4 3/4. Commercial, 50; Paris, 40 francs @ dollar; Mexican dollars, 88 @ 90.  
LONDON Consols, 98 1/2-100; Bonds (4%), 117.  
QUICKSILVER in 6 lb. by the tank @ 42 1/2 @ 45. lb.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company.

SAN FRANCISCO, FEBRUARY 10, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Thirty Nine (39), of Fifty (50) Cents per share, was declared payable on Tuesday, February Fifteenth (15), 1881. Transfer books closed on Saturday, February Twelfth (12), 1881, at 5 o'clock P. M.

WM. WILLIS, Sec'y.  
Office—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company.

San Francisco, February 1, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 14) of Twenty-five (25) Cents per share was declared, payable on Tuesday, February Fifteenth (15), 1881, at the office of the Company, Room 19, 328 Montgomery Street, San Francisco, Cal. Transfer books will be closed on February Tenth (10), 1881.

JOSEPH NASH, Sec'y.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, February 2, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, dividend (No. 25) of Seventy-five (75) Cents per share was declared, payable on Saturday, February Twelfth (12), 1881, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.  
Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

Booth Gold Mining Company.—Location of

principal place of business, San Francisco. Location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2) day of February, 1881, an assessment, No. Three (3), of Three (3) Cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room No. 44, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Seventh day of March, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the Twenty-eighth (28) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Directors, GEO. R. SPINNEY, Sec'y.  
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'49 AND '50.

MR. JOHN VANCE CHENEY'S new historical story of early days upon this Coast will be commenced in the next number of "The Californian."

A NEW SERIAL STORY will be commenced in the next number of THE CALIFORNIAN which will run during the remainder of the year. It is entitled "'49 and '50," and is a story of early days upon this coast. The author is Mr. John Vance Cheney, whose articles in the leading Eastern magazines and in THE CALIFORNIAN have received such wide and merited recognition. Mr. Cheney has had this story in preparation for THE CALIFORNIAN for some time. Competent critics, to whom it has been submitted pronounce it at once realistic and fascinating. The stirring events of 1849 and the succeeding year are vividly pictured. Absolute truthfulness of impression is sought rather than idealization. A thread of romance runs through the work, and the interest is sustained to the end.—(Note Book).

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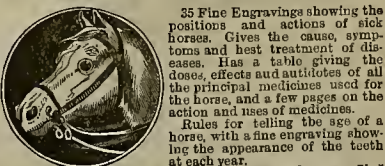
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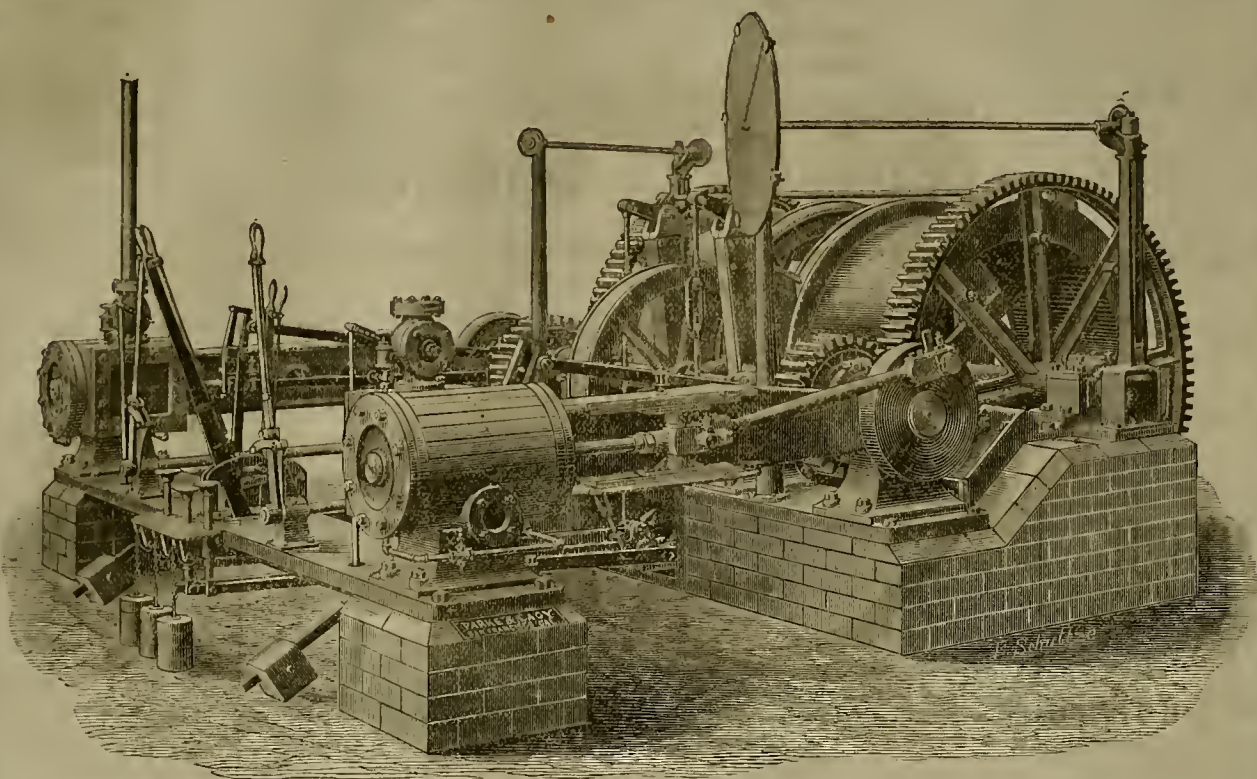
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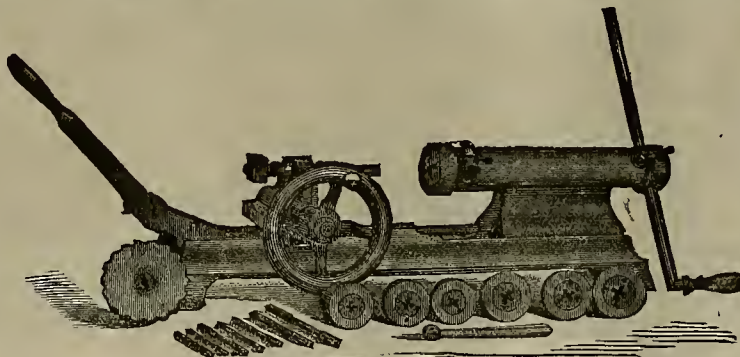
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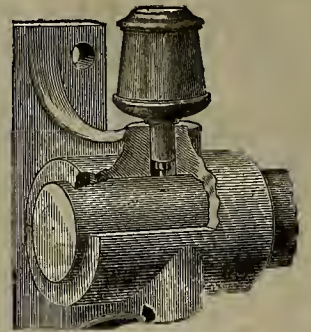
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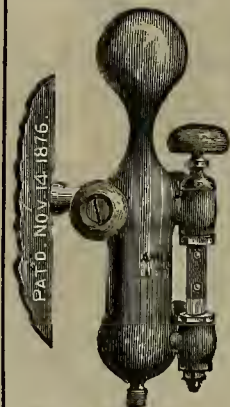
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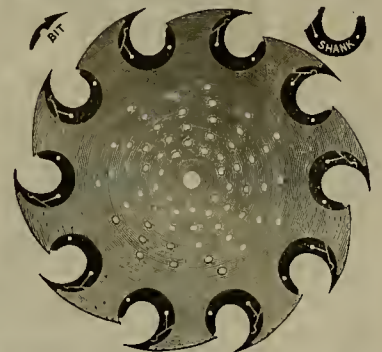
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
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SAN FRANCISCO, SATURDAY, FEBRUARY 19, 1881.

VOLUME XLII  
Number 8.

## Mining Accidents.

A man by the name of Louis Fravega, was caved on and killed instantly while at work in his claim near Whisky Slide mine, Calaveras county, last week. The man was alone in the claim at the time of the accident, but was found soon after the occurrence.

Soon after the workmen on the Santa Clara coal mine, Los Angeles county, left the mine for dinner the other day, the mine caved in through all its length. Had the accident occurred five minutes sooner, not one of the 14 miners would have escaped death.

At the Washington mine, Mariposa county, about 10 weeks ago, according to an informant of the *Gazette*, an accident occurred which illustrates the perils of a miner's life, and shows what narrow escapes can occur. It seems that while the bucket was on its way up from the 1400 ft. level, loaded with about a ton of rock, at a point 400 ft. from where it left the unsuspected miners below, by some means the brakeman above lost control of the rope, and the loaded bucket returned with much greater velocity than it went up, carrying with it four set of timbers which somewhat impeded its progress, and gave notice to the miners below that something besides ordinary thunder was the matter above. Quickly apprehending the situation they speedily took a vertical position close against the shaft, just in time to escape the awful death which was staring them in the face. The bucket fortunately passed through the fifth and last level, without hitting, striking about centrally the bottom of the shaft, simply grazing one of the men just enough to make him afterwards feel good at the thought of having so narrowly escaped death. The miners below who stood so well from under the terrible crash were Samuel Tibbetts, Richard Berkley and a Chinaman.

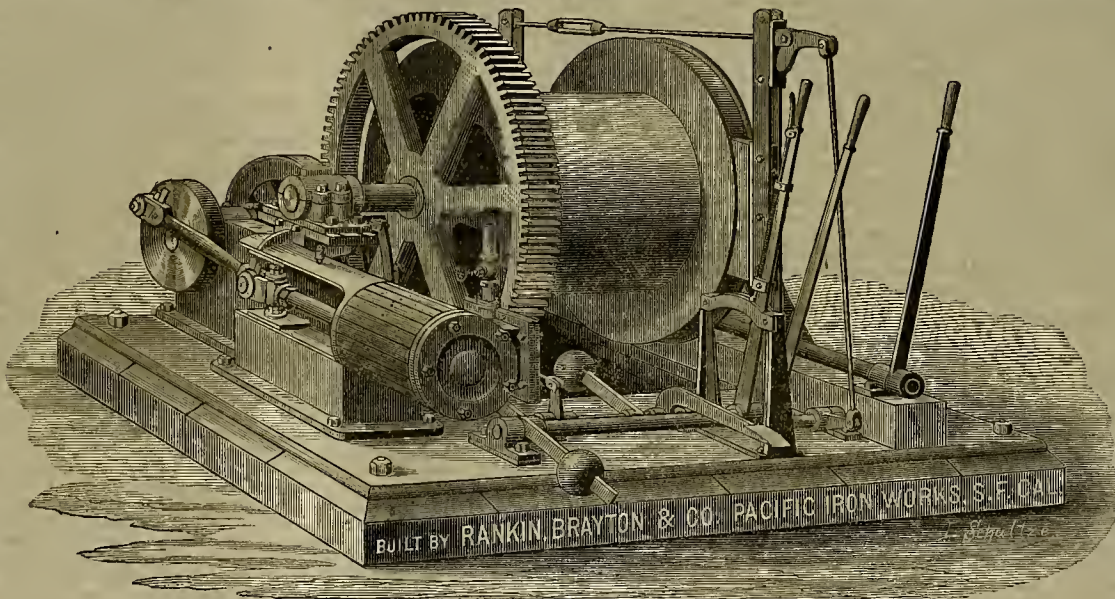
On Thursday of last week, while piping upon the claim of the Jones Hill gravel mining Co., El Dorado county, Nate Staten was pretty badly hurt. A small sized "cave" of earth came from the bank which, being thoroughly saturated with water from the excessive rains, ran along upon the bed rock like so much hot ashes, but with tremendous force. The flying mud splattered in his eyes, so blinded Staten that he was unable to see which way to run to escape the avalanche. While running he was caught, thrown down and partially covered by the debris. Upon being extricated he was found to have one badly fractured leg below the knee, besides other less serious bruises.

**THE CHASE COAL MINE FIRE.**—Advices from Victoria are to the effect that the fire in the Chase mine has burned through the roof of the No. 2 chamber, and is burning at a fearful rate in the slate stratum above. Owing to the intense heat and dense smoke it is impossible to ascertain the extent of the fire, or the direction in which it is traveling. The fire engine, however, is kept constantly at work day and night, but owing to the peculiar position of the fire the streams can only be sent up among the flames at intervals. Some incline to the opinion that the fire has struck a "pocket of coal;" others that the seams have split and the fire is now in another seam of coal. It is almost impossible to state the exact nature of the fire, for nearly every person working in the mine has a different opinion from his fellow-workman. One thing is certain; the fire is raging and, beyond causing a heavy daily expenditure of funds, is causing a great anxiety to the officers of the company and to citizens generally.

## New Geared Hoist for Round Rope.

No class of mining machinery is of more importance than hoisting works. The best mechanical talent of the coast has been brought to bear upon this subject for the past few years, and the improvement in this class of work has been very marked. Among the best new forms for hoists for single shafts that has been produced, is that illustrated on this page, made at the Pacific Iron Works, in this city. It embraces all the improvements and safeguards that experience has proved valuable in this class of machinery. It is adapted to all the requirements of practical work, and is in great favor with mines in all parts of the coast. The facilities which a hoist of this character affords for opening up a mine make it indispensable to any rapid and economical development.

The following is a description of the construction and operation of this machine: The drum is loose on the shaft, and is brought into



SINGLE DRUM GEARED HOIST FOR ROUND WIRE ROPE.

action by a clutch sliding on two steel feathers set into the shaft. The spur gear is keyed fast to the drum shaft, one bearing of which rests on a solid bracket, cast on engine frame, the other rests on a substantial bracket bolted to the foundation, which also supports the outboard end of the crank shaft. A friction band brake is attached to the fly wheel on crank shaft, and upright post brakes, with wood shoes, act upon the break ring of the drum, thus allowing the bucket to be lowered while the engine is at rest. The various levers, including the reverse lever and throttle valve, it will be observed, are arranged so as to be under the control of the engineer at one point.

They are made of two sizes and adapted to either vertical or incline shafts. A 6x10 cylinder is good for working to a depth of 400 ft. and an 8x12 for working to a depth of 600 ft.

Boilers of suitable capacity with feed pumps, are furnished at the above works; as also the axis head, sheave, shaft and boxes, making the rig complete.

**BODIE MINES.**—Twenty-three mines in Bodie are now being actively worked. Of this number, 17 have steam hoisting works of their own, two are being worked through adjacent mines having steam works, one is worked by tunnel, one by whim and two by windlass. A singular coincidence is that the two windlass mines (Union Con. and Jackson), one at the extreme north and the other at the extreme south end, have each recently made rich and important developments. Eighteen mines in the district having steam hoisting works and fair prospects of lying idle—chiefly for the want of means.

## Mining Litigation.

W. H. Howland has commenced suit against Simon Desmarchals in the Superior Court, to recover \$100,000 damages for a breach of contract on the part of defendant, to allow plaintiff to work the tailings of the French mine in El Dorado county, for one-half the gross proceeds extracted from the tailings.

The case of the Jupiter Mining Co., against the Bodie Con. Mining Co., was begun before a jury in the United States Circuit Court on Wednesday. This action was brought in July last to recover \$5,000. It is alleged in the complaint that on the 1st of February, 1880, and at various times subsequently, the defendant has intruded and entered upon certain drifts and cross-cuts of plaintiffs in Mono county and extracted 20 tons of ore, valued at \$5,000, therefrom. Defendant, in its answers, denies that plaintiff is the rightful owner of the premises on which the alleged unlawful entry was made.

## New Ore Washer.

A patent has recently been granted to S. P. Speers, of Baltimore, Md., for an ore washer which has some peculiarities. It consists of certain mechanism for conveying the gravel or ore up a series of inclined troughs, while subjecting it to the action of a current of water, combined with a series of settling tanks or chambers to receive the float gold or lighter flakes of metal.

The gravel or ore is delivered into a hopper and falls upon a screen. Then the coarser portions that fail to pass through the screen are rejected, and pass off on to a table where the coarse gold or nuggets are extracted. The portion which passes the screen falls through a spout into the first conveyer trough and is carried by the conveyer upward against a stream of water that is delivered from pipes, until it reaches the top of the conveyer trough.

It then descends through another trough to the bottom of the next conveyer of the series, and so on until the sand or refuse from which the gold has been extracted is delivered on a belt. This belt has cleats at its sides, and is provided with overlapping ends. The heavier portions of gold collect at the bottom of the conveyer troughs, and are removed from the pockets by opening certain slides specially provided.

The lighter particles are carried over by the overflow into a tank and subside in its various compartments, according to their weight, the gold being subsequently reclaimed from the earthy matters by means of amalgamation.

V-shaped partitions are placed between the troughs, and subserve an important end, in that as the area enclosed between them increases toward the top the effect of the upward current is diminished near the surface, and its power to carry over the light particles of gold with the refuse matter is proportionally diminished. This device merits the attention of mill men.

**CHINESE AND NEGROES.**—The *Herald*, in reviewing the late census statistics, finds that while the increase of the black population of the 15 Southern States, during the decade preceding 1870, was only 53%, the increase during the last 10 years was more than 35%. Regarding the increase in different States, the *Herald* says: "In Nevada they have increased, since 1870, from 3,152 to 3,420; in Colorado, from 7 to 610, of whom about one-third are in Denver; in Washington Territory, from 234 to 3,182; in Wyoming, from 143 to 914; and in Dakota, from none to 238. In Idaho and Montana there has been a marked falling away of Chinese, the decrease being from 4,274 to 3,378 in the former Territory, and 1,949 to 1,737 in the latter. New York city, which had just a round dozen in 1870, now musters 747, while Philadelphia, which started 10 years ago with precisely the same number as New York, can only show 80. Kings county enumerates 118, which may be taken as the approximate number of Chinese laundries in Brooklyn. Even New Jersey has 176 Mongolians within its borders, while Massachusetts has 237, and Connecticut 124. It is probable that New Orleans has attracted 473 to Louisiana, but St. Louis has drawn less than a hundred to Missouri."

The Bodie stage, says the *Carson Appeal*, brings in large quantities of bullion daily, yet the stocks of the mines which produce it are selling at figures which scarcely cover the cost of surface improvements.



### Silver in Sedimentary Rocks.

The following paper was read by A. W. Jackson at a recent meeting of the California Academy of Sciences, in this city:

Widespread interest has recently been developed in the subject of the occurrence of silver ores in sandstones and related sedimentary rocks, by the success which has attended the development of the famous Silver Reef mines in southern Utah. These mines ship regularly between \$70,000 and \$80,000 worth of bullion per month, most of which is derived from ores taken from two or three strata of sandstone, a rock, which, like most sedimentary rocks, is continuous over many square miles of territory.

This, certainly, must seem passing strange to the Pacific coast miner, who has been accustomed to consider that if there is any place where ores of the precious metals are *not* to be sought, it is in the sandstones and related sedimentary rocks.

The question is at once suggested: If precious metal is found in the sandstone of Utah, may it not be found in the sandstone of other districts? Has the prospector, who has, with such untiring energy, explored the most inaccessible recesses of our highest mountain chains in search of silver and gold, entirely overlooked a source of wealth which may be hidden in the monotonous sedimentary rocks of our plains and valleys? Finally, is there any practical consideration which guide the prospector which can tell him that in one locality he would seek fruitlessly for gold or silver, while in another he may hope to find it?

I think it can be shown that there is.

To the miner these are intensely

#### Practical Considerations.

If argentiferous and auriferous ores are to be sought indiscriminately in all of our sedimentary rocks, then there is scarcely an acre of the surface of the dry land but must be investigated, to prove either the presence or absence of ore. I am the more desirous of presenting a few thoughts on this subject for two reasons. On the one hand, prospectors have more than once recently sent sedimentary material to the geological department of the University, with a query as to whether ore deposits of the precious metals might be sought in them. On the other hand, one of the leading geologists of the country, Prof. Newberry, of Columbia College, N. Y., has announced a theory of the formation of the silver sandstone deposits at Silver Reef which, pushed to its legitimate conclusion, would necessitate the investigation, as I said before, of almost every acre of sedimentary rock in every country before the miner could be satisfied that gold or silver did not exist in it.

Now, I am aware that geology is far from being an exact science; furthermore, that that particular portion of it which deals with the genesis of ore deposits is one of the least understood. It is truly astonishing, when one reflects, that some of the fundamental principles of an industry which yearly adds hundreds of millions of dollars to the wealth of the country, should be so little understood.

However, while it is true that we know comparatively little about the

#### Genesis of Ore Deposits.

Still, we are not altogether in the dark. In almost every mining district, there are certain empirical laws which guide the miner in that particular district, but which are totally inapplicable, or at least not necessarily applicable, to any other district.

The laws of the occurrence of gold and silver, which are of general application, are exceedingly few.

#### The Typical Mineral Vein.

The "true fissure vein," as it is very properly called, is very simple in its structure and geological relations. It consists, essentially, of a fracture or fissure of a rock, varying from a fraction of an inch to many feet in width, of moderate length, rarely more than two or three miles, and of indefinite depth. This fissure becomes subsequently filled from side to side with ore and veinstone, probably introduced in the form of solutions from below. Very little obvious connection between the neighboring rocks and the contents of the fissure is observed. The bulk of the ore is confined almost entirely between the two walls of the fissure. It is often noticed, however, that the ore wanders out laterally into the wall rocks in sufficient quantities to render them worth mining and, to a much less extent than this, even to very considerable distances. This takes place, too, under circumstances where the conditions would seem to be exceedingly unfavorable, as in solid granite and similar rocks.

Special attention is called to this lateral impregnation of the country rocks, as it has an important bearing upon the genesis of the ore in the sedimentary deposits. The essential

#### Characteristics of Fissure Veins

Are, then, indefinite extension in depth, very moderate width (or thickness) and length, and subsequent formation to the inclosing rock.

The structure and geological relations of sedimentary rocks are in many respects quite the reverse of these. Take sandstone as a typical instance. It generally exists in the form of a widely extended horizontal deposit, covering many, often hundreds of square miles, and varying in thickness from a few feet to thousands of feet. Other stratified rock often lie both above and below it, and it is always younger than the underlying, and older than the overlying material.

Suppose such a body of rock to be impreg-

nated with silver ore more or less throughout its whole extent; you at once comprehend the vast difference in mode of occurrence between such an ore-body and the typical mineral vein previously described.

Such in general is the mode of occurrence of the ore at Silver Reef, Utah. I am indebted to Prof. Newberry and to Mr. Rolker, for several years and until quite lately Superintendent of the Stormont mine, for the facts concerning these mines; particularly to the latter gentleman, who has recently communicated a paper to the American Institute of Mining Engineers, upon the Leeds district mines, which was abstracted from the S. F. MINING AND SCIENTIFIC PRESS, December 25, 1880. I have not been able to consult Mr. Rolker's original paper, but have been compelled to content myself with the above-mentioned abstract.

I will not present a detailed description of the entire district and deposit, but will suggest only such points as bear more immediately upon the question to be discussed; namely,

How did the Silver get into the Sandstone?

Let it be remarked right here, however, that no one can pretend to furnish a complete solution of the problem in all of its details without a most minute and accurate knowledge of every detail of structure and relation presented by the deposit in place. Such a knowledge can rarely be acquired at second hand, nor can it be attained even by investigation in the field, until the mines have been much more thoroughly opened than is the case at the present time. These mines have been prospected to the depth of only — ft. The Comstock lode has been pierced to a vertical depth of nearly 3,000 ft., and scientific men are to-day unable to demonstrate precisely how the ore came into its present position, and where it came from.

The temptation to hasty generalization from insufficient data is, perhaps, no where so great as in geology. Instances without number can be cited where

#### Theorists have Fallen into Error

By drawing hasty conclusions from too few, or imperfectly observed facts. I would prefer altogether to await the accumulation of observed facts and let them explain themselves, as they always will sooner or later, if properly recorded and collated. However, the average modern investigator in almost every department of science has found it necessary to have constantly in mind what he calls a "working hypothesis" concerning the subject under investigation, which is to him the most rational of the many explanations of the phenomena in question which suggest themselves. Since we must have these hypotheses, it behooves us (particularly where practical considerations of great moment are involved, as in mining) to see that our hypotheses rigidly conform to observed facts, and that, as soon as this is not the case, we discard them for less objectionable ones.

It is in this spirit that we approach the present question, fully aware that at this distance from the field, and with the few data in hand, a complete solution is impossible, but believing that at least a rational choice from the two or three proposed hypotheses can be made.

To return, then, from this digression to the facts of the case.

#### The Silver Reef Mines

Are situated in extreme southern Utah. The sandstone containing the silver ore is of triassic age, as recently determined by Prof. Newberry. They are not to any extent metamorphosed from their primitive condition. There are two silver-bearing sandstone strata or "reefs," as they are called, overlying each other but separated by beds of clay shale. The ore, which above water line is mostly horn silver, and below it silver glance, is not homogeneously distributed through the entire rock, but is largely concentrated in ore-channels, lying one above another in the different beds. Organic remains of plants, partially or wholly converted into ore, are very plentiful; they make up, perhaps, the bulk of the ore, although it is distinctly stated by Mr. Rolker "that he had mined portions of these beds for a stretch of 200 consecutive ft., which were absolutely devoid, to the eye, of organic remains, and yet yielded an average of \$30 per ton.

On the other hand, organic remains are plentiful in sandstone layers quite free from ore, but overlaid and underlaid by sandstone free from fossils and full of good ore. Mr. Rolker also cites another instructive instance where a layer of 2 ft. of \$30 sandstone, which itself lies upon 15 inches of barren rock, under which the sandstone again carries \$20 ore.

Further, at Silver Reef comparatively little copper is found, while farther south copper enters largely into the ore, and in the same triassic sandstone on the west flank of the Nacimiento mountains in New Mexico, the silver gives place entirely to copper.

Prof. Newberry finds that the extension of these sandstones into the table lands to the east of Silver Reef, and along Cedar mountains as far north as Beaver, all contain silver, though rarely more than seven or eight ounces per ton.

Finally, in the words of Mr. Rolker, "the Silver Reefs are, where the silver is mostly concentrated, in close proximity to former volcanic centers; as is likewise the case at another less known locality, viz: at Virginia City on North Creek."

These, then, are the facts which we have to interpret. How did the silver get into the sandstone?

#### Several Theories

Have been propounded. Prof. Newberry thinks

that "the silver, like the copper which the sandstones contain, was deposited with them, and not introduced subsequently."

Mr. Cazin, of New York, takes exception to this and thinks that "the ore deposits both of copper and silver in the triassic sand-rocks, are precipitations from solutions containing metals, upon animal and vegetable matter, such matter, and not the metallic ores, being contemporaneous with the deposition of the sandstone." This is really, however, one of the possible interpretations which can be given to Prof. Newberry's statement of the case.

The usually accepted theory is that the metal solutions come from below, and are dependent upon, and immediately subsequent to, the eruption of igneous rocks in the vicinity of the present deposits. The hot springs bringing the metal solutions are the last dying manifestations of subterranean activity.

Let us examine these theories in the order indicated.

It is unfortunate that Prof. Newberry's opinion is not couched in specific language. It was probably not intended as a scientific statement, as it was contained in a personal letter to the President of the Stormont mining company, published in the *Engineering and Mining Journal* of October 23, 1880. It is susceptible of two or three quite different interpretations, possessing in common only the fact of contemporaneity of deposition of the inclosing sandstones. I will give first the most natural one and the one which I think he intended, viz: that the ores were precipitated out from solution in the ocean, at the bottom of which the sandstones were formed. The only ground for this view given by Prof. Newberry, is his discovery of copper and silver in the same triassic sandstones in the table lands to the east, and as far north as Beaver.

Now, on the one hand this comparatively widespread impregnation can be equally well explained by another theory, while on the other hand the theory itself seems to be unable to explain already observed facts. Conceding for the moment that the theory is the true one, there are two ways by which this precipitation could be effected, viz: by separation, caused by over concentration of the triassic ocean, or by reduction out of a far less concentrated solution by means of organic matter.

I find it hard to believe that Prof. Newberry would have us accept the first method. It would be like asking us to believe that the Pacific ocean, or any considerable area thereof, was made up of a concentrated solution of blue vitriol.

Mr. Rolker urges against this view that it would necessitate the existence at the present time of an homogeneous mechanical impregnation of the entire triassic sandstone covering hundreds of square miles in Utah, New Mexico and Colorado, while, as a fact, we find the most of the ore locally segregated, and but a small amount at distances removed from these local segregations. This objection is not a valid one, as it is quite possible for the local segregation to have been entirely subsequent to the original deposition of the ore and sandstones. One certainly could not explain upon this hypothesis, however, the peculiar form in which this local concentration is at present found, viz. in ore channels lying over each other in the two beds.

It is likewise difficult to conceive how the alternation of sandstone layers, rich in silver, poor in silver, and free from silver, as described above, could be explained upon this hypothesis. We should have to suppose the superincumbent ocean to be alternately exhausted and resupplied several times, or else, that later, the ore in the now barren sandstone was leached out and concentrated in the next lower bed. The first supposition is, to say the least, a strained one; and as for the second, there certainly appears to be no good reason why such a leaching process, if it took place at all, should favor narrow zones of but 15 inches thickness, and not be general over the entire sandstone bed.

Again, there seems to be no adequate relation between the amount of ore existing in the sandstones and the amount of copper and silver salts required to saturate an ocean to the point of deposition.

Finally, the fact that the Silver Reef region contains almost exclusively silver ores, while farther south it becomes largely replaced by copper, and again still farther to the southeast in the triassic sandstone of the Nacimiento mountains, in New Mexico, the silver gives place entirely to the copper, seems to me fatal to the hypothesis. I do not see how a subsequent separation of copper from silver over such an extensive area could be brought about.

Without denying, however, that in the progress of chemical geology the chemical possibility may be established, it must at least be acknowledged that at the present day it looks like an arbitrary assumption.

The second method of deposition above indicated, viz:

#### Reduction by Organic Matter

Out of a sea very far below the point of saturation is an altogether more rational assumption. We are quite prepared to believe that a minute proportion of silver existed in the waters of the triassic ocean, inasmuch as it appears highly probable, although not yet directly proven, that copper and silver exist in the sea water of the present ocean in exceedingly minute quantity.

Now, while organic matter would unquestionably reduce the ore even from exceedingly dilute solution, my principal objection to this

view of the question is, that in an ocean made up of such a dilute solution, there would be even far less probability that most of the copper would be reduced in one portion of the sea-bed, as at the Nacimiento mountains, while most of the silver was deposited in a different portion of the same sea as at Silver Reef.

Ocean currents would certainly bring about a comparatively homogeneous composition to the whole body of water, necessitating a chemically homogeneous impregnation of copper and silver over the entire triassic area; and as I have said before, I do not see how the copper and silver could subsequently become differentiated. But again, conceding this to be possible, neither of these theories would explain why the ores in the two or three principal localities (Silver Reef and Virgin City, Utah, and on the west flank of the Nacimiento mountains, in New Mexico,) should become concentrated in the vicinity of eruptive rocks and, so far as we yet know, there only.

Mr. Cazin advocates essentially this theory of reduction by organic matter out of an ocean containing an exceedingly small amount of copper and silver. He modifies it, however, by assuming that the deposition of the organic matter only, was contemporaneous with the formation of the sandstones, which organic matter became gradually converted in ore by exposure during thousands of years to the waters of the superincumbent ocean percolating downward through the subsequently formed and forming sandstone.

The theory even thus modified, is open, however, to all of the objections above stated.

The only remaining interpolation that can be given to Prof. Newberry's language (and this, in my estimation, is the most plausible of all) is, that the ore particles are the result of the

#### Mechanical Disintegration of Pre-Existing Ore Deposits.

Just as the grains of quartz in the sandstones are the result of the mechanical disintegration of pre-existing silicious rocks, or that the ore grains thus originally formed by mechanical disintegration became subsequently oxydized into sulphates, and again reduced to sulphides by the organic matter in the sandstones.

A fatal objection to the first process (as indicated by Cazin) is that the difference in specific gravity between the ore grains and the sand grains would inevitably lead to the mechanical segregation of the ore, in comparatively restricted areas. Furthermore, the ore particles are not rounded or water worn, but have evidently been formed just where they are now found, proven also by the plant remains converted into ore, which would not bear transportation and preserve their form.

The second process, viz: Oxydation to sulphate and subsequent reduction by organic matter would obviate the objection that the ore particles are not rounded, but would certainly not, that founded upon differences of S. G., although such a process would certainly admit of a far more extensive impregnation of the sandstone than the purely mechanical theory.

Further, we have the testimony of Mr. Rolker, that the mountains in the immediate vicinity of these deposits have as yet revealed no ore bodies to the industrious prospector, while the nearest vein deposits situated to the north, contain gold and lead with the silver. Rolker pertinently asks if the ores are derived from this source, why do we not find lead or gold with the silver in the sandstones?

Finally neither of these theories explains the occurrence of the ore in channels previously described, nor the concentration in the neighborhood of eruptive rocks.

There being, then, valid objections to all of the theories thus far suggested, let us turn to the last and most generally accepted theory, viz: That the

#### Metallic Solution Came from Below.

And were dependent upon and immediately subsequent to the eruption of the igneous rocks in the neighborhood of the present deposit.

In the first place, let it be noted that this is substantially the theory ordinarily accepted for the formation of true fissure veins, so that if it can be made equally applicable to such deposits as these under consideration, there would be a certain amount of presumption in its favor even if other things were equal. As fast as a hypothesis becomes gratuitous in science, it is eliminated—it becomes unnecessary. Not that nature always produces the same effects in precisely the same way. Too close adherence to this idea has frequently led into error. The only safe test is for each specific case to bring our theories to the ordeal of a satisfactory explanation of observed facts. In the present instance I fail to see a single fact which cannot be explained upon this hypothesis.

In the first place the igneous rocks are in close proximity to every locality where ore in paying quantities has been discovered.

It explains the occurrence of the ore in schuttes or ore channels, one above another in different beds. The eruption of igneous rocks could not fail to fissure more or less the adjacent sedimentary rocks. The solutions which followed, bringing the silver and copper would come through these fissures, and would, of course, deposit the greater portion of their metallic contents in and near the fissures which now form the ore channels. It would explain the alternation of rich and barren zones in the sandstone. We know that solutions will travel in channels, offering the least resistance. The layers richest in ore will be such channels and in proportion as the

(CONTINUED ON PAGE 118.)



## MECHANICAL PROGRESS.

## Rotary Cutters for Metals.

It would seem, to the experienced machinist, that the manners, and methods and means of working metals could have been reduced to an exact science. The planer, the lathe, the drill, the shaping machine, the milling machine, and other general and special tools are usually considered to have covered the ground of reducing and sizing metallic objects; the abrading and abolishing of the work being relegated to another branch.

But somehow the different manipulations on and processes of working metals seem to be so intimately connected that in many instances one department and one method overlaps and engages with another.

It is hard to point out the dividing line between turning (cutting) and finishing and polishing; it is difficult to determine where drilling and milling are separate; to say what difference there is in the resultant action of the shaping-machine and the profiling machine, although one acts with a fixed cutter and the other with a rotary cutter. The result of file finishing and corundum, or emery, finishing may show apparent difference to the mechanical eye, but the object sought may be equally gained by one method as well as by another.

The uses of these natural abrading materials are yet in their infancy. To make a turning or planing tool requires stock—the best of steel—and hard labor, and dulness and wear of the cutting edge requires additional labor and considerable skill to put the tool in shape again. Whereas, the emery wheel is a constant, requiring only occasional dressing, easily made. It is noticeable that most of the improvements in the working of metals could drift toward the application of rotary contrivances, and that the emery wheel is largely superseding the chisel edge and the serrated edge, as represented by the turning and planing tool and the file. In fact, the milling machine has stolen a large share of old time lathe, planer and vise work, and almost rules in the shop, its control being shared by the stone and emery wheel.

All this movement is in one direction, and it is not surprising that advanced mechanics insist that the movement has not reached its maximum. These improvers assert that a large amount of the work now done by the lathe and the planer with fixed tools should be done by modifications of these machines with rotary tools; and recently an ingenious and progressive mechanic has given proof of the advantages of substituting rotary for fixed cutters in the lathe and on the planer. His idea is to use mills of small diameter in place of the cutters in general use. A quotation from his own statement is better than a synopsis of his plan.

"All fixed and stationary cutting tools are merely chisels, driven either by percussion or by pressure; the percussion must be regular and equal or the work will be ridgy and 'chattered.' The pressure must be uniform, a condition impossible where the object to be turned is suspended on centers, which allows more or less recess on from the cutting point as the circumferential resistance is greater or lesser. But with a rapidly revolving cutter there is no time for recovery from the attack of the abrading cutter, and no chance of any projection or prominence overcoming the attack of the tool. So on the planer the spring and 'action' of the fixed tool leaves the surface in a series of transverse ridges; the finishing cut being only a reduction of this fault but not a removal of it. There is no planed surface but is a series of ridges; no smooth surface is possible with a fixed tool in a planer head. So in the lathe, it is impossible to turn a journal except its surface be left in ridges, which cannot be ground down and will not wear down. I insist that better work can be done on the lathe and the planer by rotary cutters than by any fixed cutter. The improvement will be as much as the sliding cut of the planer chisel over the percussion cut of the cold chisel. The only known means of producing an equal surface on metals is by a rotary motion. This is seen in our means of polishing and our methods of finishing. No true surface is expected by longitudinal or transverse motions. In either case the ridges must be removed by rotary motion. So in the lathe and the planer, the fixed cutter in one produces longitudinal ridges, and the other transverse ridges, to be removed after the work is done by rotary polishing or rotary wear. I claim that the only proper way of sizing metals is by rotary tools."

This mechanic has made some tests that appear to favor his plan. He rigged up a lathe with a rotary mill in place of the ordinary fixed chisel and turned a shaft of two and a half inches from the rough to size with one going over of the mill. The shaft was revolved at a rate somewhat less than for ordinary turning, and the mill driven by an overhead belt at as rapid a rate as it could stand, being fed with soda water.

The mill was only one and a half inches diameter with between 30 and 40 teeth, and was fed with a feed of about 30 to the inch. It should be stated that this was as rapid a feed as he could get on the lathe, and he thought a feed of 20 or 22 would give better results. The specimen showed excellent work, very true as to circumference and very smooth as to surface.

On the planer he introduced a similar mill in place of the chisel cutter, but he had to run his

planer at a lower speed than with the chisel cutter. The result, however, was very fine, a smooth surface apparently needing little more than ordinary stoning to make a good finish.—*Boston Jour. Com.*

## Saws.

The grand secret of putting any saw in the best possible cutting order consists in filing the teeth at a given angle to cut rapidly, and of a uniform length, so that the points will all touch a straight-edged rule without showing a variation of 100th part of an inch. Besides this there should be just enough set in the teeth to cut a kerf as narrow as it can be made, and at the same time allow the blade to work freely without pinching. On the contrary, the kerf must not be so wide as to permit the blade to rattle when in motion. The very points of the teeth do the cutting. If one tooth is a twentieth of an inch longer than two or three on each side of it, the long tooth will be required to do so much more cutting than it should, that the sawing cannot be done well. Hence the saw goes jumping along, working hard and cutting slowly. If one tooth is longer than those on either side of it, the short ones do not cut, although the points may be sharp. When putting a cross-cut saw in order, it will pay well to dress the points with an old file, and afterwards sharpen them with a fine whetstone. Much mechanical skill is requisite to put a saw in prime order. One careless thrust with a file will shorten the point of a tooth so much that it will be utterly useless, so far as cutting is concerned. The teeth should be set with much care, and the filing should be done with great accuracy. If the teeth are uneven at the points a large flat file should be secured to a block of wood in such a manner that the very points only may be jointed, so that the cutting edge of the same may be in a complete line or circle. Every tooth should cut a little as the saw is worked. The teeth of a handsaw, for all sorts of work, should be filed fleaming, or at an angle on the front edge, while the back edges may be filed fleaming or square across the blade. The best way to file a circular saw for cutting wood across the grain is to dress every fifth tooth square across and about one-twentieth of an inch shorter than the others, which should be filed fleaming at an angle of about 40°.

**ANOTHER DEPARTURE IN LOCOMOTIVE BUILDING.**—There seems to be an inclination of late to depart from the long existing and uniform style of locomotive building. We have already described a locomotive with a double set of driving wheels, the one over the other, the lower ones being actuated by friction; and here comes the description of still another departure, which we clip from a cotemporary: A locomotive of rather unusual shape is building at the Concord railroad repair shop at Concord, N. H. The boiler, instead of being round is flat—some 2 ft. thick by 7 ft. wide and 12 ft. long—the tubes running horizontally; this boiler rests over the fire-box and in the middle of the locomotive, the engineer's position being in a little cab, similar to a wheelhouse on a steamer, at the forward end, while the fireman's position is at the opposite end as now, the whole "machine" being considerably longer than the largest used at present. The inventor is a young man, by the name of Stevens, whose name this novel locomotive will bear. The greatest idea is the economy of fuel, the boiler being flat, and covering over so much of the fire-box, while the water will in no case be to any great depth as now. The invention was shown by J. H. Pearson, one of the largest shareholders, who was so pleased with it that he made arrangements to have one built for trial. It will be several weeks before this engine will be finished, and should it meet the expectations of its friends it will be quite a departure from the present style of locomotive.

**WATER POWER AND STEAM.**—The partial or entire discarding of water power by a large number of Northern and Eastern manufacturers is one of the industrial features of the hour. Favorable sites where a fall of water could be secured, led to the foundation of the most important of the New England industrial centers, but as time has gone on the power available has been found insufficient in itself and steam manufacturing has sprung up in the vicinity. This has been the case at Paterson, N. J., Lowell, and numerous other localities we could enumerate. Manufacturing operations have now attained a magnitude that renders absolute dependence on a supply of water subject to the drouth of summer or congealing in winter out of the question, being a source of constant loss. Hence, steam is everywhere in the ascendant, either as a supplemental or exclusive agent of power. Steam, unlike water power, has no assignable limits, and the means of further economizing its application are assiduously sought out with its more exclusive use; yet water power will always be a factor of value, and the great West still offers magnificent sites to which manufacturers are flocking to undergo the same experience of the more populated Northern and Eastern States.

**POTTERY IN THE UNITED STATES.**—There are now 500 potteries in the United States, the total products of which supply 50% of the wares annually consumed, the chief centers of the industry being Trenton, the capital of New Jersey, and East Liverpool, in Ohio.

## SCIENTIFIC PROGRESS.

## The Influence of a Tuning-Fork on the Garden Spider.

Having made some observations on the garden spider which are I believe new, I send a short account of them in the hope that they may be of interest to the readers of *Nature*.

Last autumn, while watching some spiders spinning their beautiful geometrical webs, it occurred to me to try what effect a tuning-fork would have upon them. On sounding an A fork and lightly touching with it any loaf or other support of the web or any portion of the web itself, I found that the spider, if at the center of the web, rapidly slow round so as to face the direction of the fork, feeling with its fore feet along which radial thread the vibration travels. Having become satisfied on this point, it next darts along that thread till it reaches either the fork itself or a junction of two or more threads, the right one of which it instantly determines as before. If the fork is not removed when the spider has arrived it seems to have the same charm as any fly; for the spider seizes it, embraces it, and runs about on the legs of the fork as often as it is made to sound, never seeming to learn by experience that other things may huzz besides its natural food.

If the spider is not at the centre of the web at the time that the fork is applied, it cannot tell which way to go until it has been to the centre to ascertain which radial thread is vibrating, unless of course it should happen to be on that particular thread or one stretched supporting thread in contact with the fork.

If when a spider has been enticed to the edge of the web, the fork is withdrawn and then gradually brought near, the spider is aware of its presence and of its direction, and reaches out as far as possible in the direction of the fork, but if a sounding fork is gradually brought near a spider that has not been disturbed, but which is waiting as usual in the middle of the web, then instead of reaching out towards the fork the spider instantly drops—at the end of a thread of course. If under these conditions the fork is made to touch any part of the web, the spider is aware of the fact and climbs the thread and reaches the fork with marvelous rapidity. The spider never leaves the centre of the web without a thread along which to travel back. If after enticing a spider out we cut this thread with a pair of scissors, the spider seems to be unable to get back without doing considerable damage to the web, generally gumming together the sticky parallel threads in groups of three and four.

By means of a tuning-fork a spider may be made to eat what it would otherwise avoid. I took a fly that had been drowned in paraffin and put it into a spider's web and then attracted the spider by touching the fly with a fork. When the spider had come to the conclusion that it was not suitable food and was leaving it, I touched the fly again. This had the same effect as before, and as often as the spider began to leave the fly I again touched it, and by this means compelled the spider to eat a large portion of the fly.

The few house-spiders that I have found do not seem to appreciate the tuning-fork, but retreat into their hiding-places as when frightened; yet the supposed fondness of spiders for music must surely have some connection with these observations, and when they come out to listen, is it not that they cannot tell which way to proceed?

The few observations that I have made are necessarily imperfect, but I send them, as they afford a method which might lead a naturalist to notice habits otherwise difficult to observe, and so to arrive at conclusions which I in my ignorance of natural history must leave to others.—*C. V. Boys, in Nature*.

**THE CURRENT OF RIVERS.**—A very slight dexterity suffices to give the running motion to water. Three inches per mile in a smooth, straight channel gives the velocity of about three miles an hour. The Ganges, which gathers the waters of the Himalaya mountains, the loftiest in the world, is, at 100 miles from its mouth, only 300 ft. above the level of the sea, and to fall 300 ft. in its long course, the water requires more than a month. The great river Magdalena, in South America, running for 1,000 miles between two ridges of the Andes, falls only 500 ft. in all that distance. Above the distance of 1,000 miles, it is seen descending in rapids and cataracts from the mountains. The gigantic Rio de la Plata has so gentle a descent into the ocean that, in Paraguay, 1,500 miles from its mouth, large ships are seen which have sailed against the current all the way by the force of the wind alone—that is to say, which, on the beautiful inclined plane of the stream, have been gradually lifted by the soft wind, and even against the current, to an elevation greater than our loftiest spires.

**A NEW ILLUMINANT.**—Herr Kordig, a Hungarian, has lately been performing some very curious experiments at scientific meetings in Paris with a new volatile combustible essence, which is offered for lighting purposes. Having arranged on the table several lamps in which the essence burns with a beautiful bright flame, Herr Kordig pours a quantity of the liquid on his hat and lights it, whereupon a long flame springs up to the ceiling. To the surprise of

the audience, he puts his hat on his head and waits till the flame goes out. The hat is then shown to be intact. He pours some of the liquid on the floor and on a handkerchief and lights it. The floor and the handkerchief are noways damaged. Some drops may be put in the hollow of one's hand and burnt without producing appreciable pain. These extraordinary facts are easily explained. Herr Kordig's mineral essence boils at about 35° C., and the tension of its vapor is considerable, so that it is not the liquid that burns, but its vapor. He states that the liquid is a very volatile essence of naphtha, with a certain mixture of ether of its composition added. The new essence is said to be obtained quite simply from natural oil seeds recently discovered in Hungary, and the cost is low. The liquid has a slight smell of petroleum, and produces on the hand a cold sensation like ether.

**A NEW PROPERTY IN SELENIUM.**—M. Blondlot has communicated the results of some investigation on a new property of selenium, which is of timely interest in view of the famous researches of Bell and Tainter. M. Blondlot finds that when a piece of annealed selenium is connected to one pole of a Lippmann capillary electrometer, by means of a platinum wire, and a plate of platinum is similarly connected to the other pole, a comparatively powerful electric current is developed by rubbing the selenium against the platinum plate, as is shown by the deflection on the electrometer scale. Mere contact between the selenium and the metal produces no deviation from the zero; but the act of rubbing readily gives an electromotive force equal to that of a sulphate of copper cell. As if to take the effect still further out of the category of those already recognized, M. Blondlot has verified the facts that neither the rubbing of two metals against each other, nor an isolating substance against a metal, nor two isolating substances, can produce a change in the capillary electrometer. The current flows through the electrometer from the unrubbed to the rubbed surface of the selenium. Now a thermo-electric current set up by heating a selenium-platinum junction would, as M. Blondlot points out, flow through the electrometer from the hot selenium surface to the cold one, or in precisely the opposite direction; hence, the novel effect cannot be due to heat developed by the friction.

## THE ACTION OF CHLOROPHYL IN VEGETABLE

**GROWTH.**—The question of the use of chlorophyll in vegetable growth does not as yet appear to be definitely settled. Pringsheim, it will be remembered, recently suggested that chlorophyll was chiefly of use as a screen to protect the subjacent cells and their contents from those rays of light which would be adverse to the secondary processes that have been distinguished as growth. But Dr. Gilbert, in his recent address to the chemical section of the British association, points out that the plant may receive abundance of nitrogen, may produce abundance of chlorophyll, and be subject to the influence of sufficient light, and may yet not assimilate a due amount of carbon. He shows that the presence of a due supply of potassium salt and of sufficient available nitrogen is necessary for the proper assimilation of carbon by plants. The amount of carbon assimilated evidently does not depend on the protective power of the chlorophyll alone, nor on its chemical action. In connection with the coloring matter of leaves it has been observed that the leaves of the Virginia creeper change to the well-known, beautiful red hue sooner on walls exposed to the north and east, and that if the weather be wet during the time when they usually change color the red tint is only sparingly developed.

**THE VOICE OF FISHES.**—Some discussion has recently taken place in regard to voice in fishes. A correspondent to the *Scientific American*, writing from Parkersburg, West Virginia, says with reference to the note on the subject in a late number of that paper, that the white perch of the Ohio river will often follow a boat for a considerable distance, all the time making a peculiar humming noise like that of a telegraph wire in the wind. He has heard the fish make the same sound when imprisoned in a fish box to keep it alive.

**EGYPTIAN OBELISKS.**—There are 30 of them at the present time scattered over Europe. Rome has 11, four of which are higher than our New York obelisk. The highest of the Roman obelisks, which is also the highest in Europe, stands before the church of St. John Lateran. The obelisk in the piazza of St. Peter's is 82 ft. 9 inches high. Both of these were mounted on high pedestals. The pedestal of the St. John Lateran obelisk is 44 ft. high, making the entire height of obelisk and pedestal 150 ft. The pedestal of the St. Peter's obelisk is a trifle less than 50 ft. high, making the whole height of the monument 132 ft. 2 inches.

**AN ELECTRIC WATCH.**—A watchmaker at Copenhagen, of the name of Sonderberg, is reported to have made a watch which requires no winding up, inasmuch as it performs that work itself by means of an electric current. An electric magnet fixed inside the watch keeps the spring perpetually in a state of tension. All that is required to keep the watch running is to preserve the battery in proper working order, for which purpose one or two inspections in a twelve-month are said to be sufficient.



**BODIE DISTRICT.**—*Free Press*, Feb. 8: The Syndicate is still stoping ore from the Caeola vein, 300 level, but will probably run the mill on custom ore next month and resume work in the west crosscut, 950 level, to cut the same vein at that depth. The Standard Con. has made a regu-



lar boom in the hullion business. On Tuesday of last week it shipped \$59,943.26, and on Monday of this week \$131,935.27, and the average pulp assay jumped from \$49.74 to \$75.53. The west crosscut, 1000 level, is in favorable ground, and will probably reach the ore body within 10 days or 2 weeks. Bodie still holds its own, the ore milling about \$115 per ton. The Lent shaft is down 430 ft. and a second installment of heavy machinery is on the road near Bridgeport. The north drift, 600 level, of the Con. Pacific, is showing some fine silver ore. Toga is still driving the west crosscut, 922 level, and stringers of quartz and day are coming in. They ought to reach the vein inside of 2 weeks. In Concordia the Taylor vein is strong 70 ft above the 400 level, and the porphyry for several lodes each side of the vein is strongly mineralized, being coated with silver. The east or main Concordia vein is also improving in the north drift. In Boston Con., sinking for the 400 level has been commenced, the vein on the 300 level having proved to be a good one for a distance of 315 ft. Jupiter has started a new crosscut 230 ft south of the shaft, to prospect the favorable looking ground to the east of the south drift. The rich strike of the 512 level of Noonday is growing in importance. The winze following the foot-wall in this ore is down 35 ft, and on Monday a crosscut was driven 5 ft into the ore without the slightest indication of the near proximity of the hanging wall, the ore in the face of the crosscut being fairly as rich as at any other point. It will be remembered that the 512 level ore was 35 ft wide and of good quality. All the stopes in both Noonday and North Noonday are looking well. Goodshaw will clean up to-day (Tuesday) the result of a crushing of 95 tons of ore. The south drift, 600 level of this mine, is still being pushed, and the work of sinking the shaft will be commenced next week. The Champion has not yet commenced sinking, but will probably be in shape in a few days. The south drift is still sinking. Bodie Tunnel is shipping ore to the Miners' mill, the ore being taken from north and south drifts in the Festoon or No. 20 vein. Blackhawk is showing an improvement both in quantity and quality of ore in the winze from the west crosscut, 700 level, the winze being down 70 ft. The Spaulding mill will start up to-day on Spaulding ore, so that there will not be an idle stamp in the district.

## NEVADA.

**DEER CREEK.**—*Herald*, Feb. 14: The mines down Deer creek are now all running in full blast. The Providence, Merrifield, Mountaineer and Wyoehue and Spargo, are all making good showings. The Michel amalgamating pan, that is now in operation on the creek between the Providence and Merrifield mines, is showing better results since alteration was made in the regulation of the water power. The Charronnet mine, at Canada hill, continues to look as well as ever. The incline having been sunk 100 ft below the drain tunnel, drifting has been commenced both ways. The ledge, though a little smaller, yields very rich rock. About 120 tons are now lying on the dump, and will be hauled to the mill as soon as the water will permit. A fine specimen of this ore was on exhibition to-day at Isaac's store.

**A PAYING MINE.**—*Nevada Transcript*, Feb. 11: The little hydraulic claim formerly known as the Knickerbocker, and now owned by Messrs. Lindemeyer & Hottinger, which is situated just above Sargent & Jacobs' claim at Quaker hill, is a paying piece of property. A clean-up of \$2,002 has just been made after a run of 20 days with one monitor. The total expense of the run looks up to over \$350, leaving a net gain of \$1,650 for the owner, or over \$82 a day. The gold found there is worth \$19.41 an ounce.

**TRUE BLUE.**—Work at the True Blue drift claim, Mt. Oro, is progressing as favorably as could be expected during such weather as has been prevailing throughout the county for several weeks past. The new incline is already down 30 ft, and rapidly nearing the extensive and rich gold deposit exposed to underlie the ridge. The erection of the new hoisting and pumping works has been delayed on account of the roads being in such a bad condition as to prevent hauling the machinery up there. There is no likelihood that the pump will be required, however, till the cement has been tamped.

## PLACER.

**IOWA HILL.**—*Cor. Pacer Argus*, Feb. 12: Indian canyon never was so high, and the Orion Con. has had to stop washing and turn all their attention to the trestle which supports their pipe across the canyon, and which is ordinarily submerged beneath the tailings. Despite all their precautions part of it was swept away Saturday night, and the slides began to undermine the ridge. The erection of the new hoisting and pumping works has been delayed on account of the roads being in such a bad condition as to prevent hauling the machinery up there. There is no likelihood that the pump will be required, however, till the cement has been tamped.

## PLUMAS.

**ROUND VALLEY WATER CO.**—*Greenville Bulletin*, Feb. 12: On Saturday we visited the reservoir and made a careful inspection of the dam, as fears had been expressed by a number of persons that it might give way, in which case this town would be badly injured. The reservoir covers over 700 acres, and the water will probably average nearly 20 ft in depth. The dam is in every way safe and substantial, and the natural conformation is such as rendered it an easy matter to construct the dam.

**SOUTHERN EUREKA CON.**—The new 10-stamp mill is now completed. The engine was started for trial on Monday, and the clear, sharp whistle sounded plainly in town. The mill is completely ready to go to work, and is provided with 80 square ft of first-class silver plates. The chimney in the mine has just been reached, and the quality of ore developed is very superior. Supt. Bransford expects to have the mill under full headway in a day or two, and anticipates the most favorable results.

**CHEROKEE.**—Last Saturday we visited the Cherokee and Green Mountain mines, and witnessed some of the effects of the terrible storm. So much rain has fallen that the ground is thoroughly soaked, and on the steep side-hills there are numerous slides. For several hundred ft in length the earth loosens, breaks off from the hill and down goes the huge mass, carrying large pine trees with it, and uprooting them as if they were but dry twigs. Along the side of these steep hills, winding in and out the numerous canyons, is the ditch and flume of the Round Valley Water Company, which supplies the water for the Green Mountain mills. At 3 different places slides have completely destroyed away vestige of the ditch. In one place it was found necessary to turn across a canyon and build a flume, rather than dig out the buried ditch.

## SIERRA.

**NORTHERN SIERRA.**—*Mountain Messenger*, Feb. 12: The recent almost unparalleled severe rain storms in the Sierras have created havoc over the northern part of our county. George W. Swan, of the La Porte and Morris-town gold gravel hydraulic mining property, is putting the ground in working order, and, no doubt, will return good dividends to its lucky owners, as he is a sterling, good manager, which supplies the water for the Green Mountain mills. At 3 different places slides have completely destroyed away vestige of the ditch. In one place it was found necessary to turn across a canyon and build a flume, rather than dig out the buried ditch.

**NORRIS.**—The St. Louis monster water pipe, 34 inches in diameter, lately hurled, not yet repaired. At Gardner's Point all the ditches are full. Part of Col. Baker's flume is demolished, and the blocks are gone. At Port Wine, ahead manager, which supplies the water for the Green Mountain mills. At 3 different places slides have completely destroyed away vestige of the ditch. In one place it was found necessary to turn across a canyon and build a flume, rather than dig out the buried ditch.

the gravel banks blasted down last fall. Poverty Hill diggings are being worked under the energetic and able management of one of its owners, S. Kingdon, which has already been remunerative.

**HOWLAND PLAT.**—Supervisor J. K. Walls, who arrived last Sunday evening from Howland Flat, we learn that there is between 3 and 4 ft of snow at that mining camp, and near 8 on the ridge separating Slate and Canyon creeks. For 36 hours snow fell, followed by the same period of clear weather, succeeded by a 9 days' continuous rainfall, the longest ever known at that rather elevated level, 5,800 ft above the sea level, ending with about 2 inches of snow. It is estimated that more water fell than usually does in an entire winter season. All new snow has disappeared. The old snow is frozen hard, and will not turn water.

## NEVADA.

### WASHOE DISTRICT.

**CALIFORNIA.**—*Virginia City Enterprise*, Feb. 13: On the 2300 level the joint Ophir east winze has been connected with the upraise from the 2500 level. The joint Con. Virginia east crosscut has been advanced 21 ft. On the 2500 level the south drift from the Ophir line has been advanced 18 ft; the joint Ophir east crosscut has been advanced 18 ft, and the joint Ophir upraise connected with the winze from the 2500 level, and is now enlarging the winze to the full size of the upraise.

**UNION SHAFT.**—Sunk and timbered 10 ft; repairing the 1600 drift, and casing the timbers at the 1900 station.

**UNION CON.**—The joint Mexican east crosscut has been extended 30 ft, and the joint Sierra Nevada east crosscut 34 ft.

**MEXICAN.**—On the 2500 level the joint Ophir east winze has been sunk and timbered 21 ft, and the joint Union Con. east crosscut has been advanced 30 ft.

**HALE & NOKROSS.**—We lowered the cages on the 10th inst, the first time since the first. Miners are at work clearing away the broken stave and damaged cables. Work on the ore-house is progressing rapidly. This completes the construction work.

**CON. VIRGINIA.**—On the 2300 level the south lateral drift has been extended 13 ft. On the 2500 level the joint California west drift to the C. & C. shaft has been extended 32 ft.

**UTAH.**—During the past week the east drift on the 2150 level has been extended 24 ft. The ground is soft and working well. Work on the east drift, 1950 level, has been discontinued at a point 048 ft east of the incline. We are now engaged in cleaning out the sump, preparatory to sinking the incline for another level.

**SIXTH NEVADA.**—On the 2300 level the upraise has been advanced 30 ft; total length, 540 ft. On the 2500 level the north lateral drift has been advanced 55 ft; total length, 515 ft. During the week 99 tons of ore have been extracted, assaying from \$18 to \$103 per ton.

**OPHIR.**—On the 2500 level the joint Mexican east winze has been sunk and timbered 21 ft; the joint California upraise has been connected with the winze down from the 2300 level, and is now being enlarged and timbered.

**SUTRO TUNNEL.**—South Lateral.—The repair and header shifts have been at work during the week retimbering, easing timbers and repairing the drift near the face. One gang of men is employed, about 21 ft from the face, retimbering the ground and working towards the face. Another gang is engaged at a point about 43 ft from the face in retimbering, easing timbers and repairing towards the face. At present some hot water is flowing from the east side, which was probably dry when the drift was run. Sixty-one ft has been completed (retimbered, etc.), including 15 new sets. Total distance to the Yellow Jacket shaft, 976 ft. Flow of water in standard gallons, 3,612,900.

**YELLOW JACKET.**—The Suto tunnel level drift has been extended 50 ft during the past week, making the present length of some 340 ft from the switch, or 410 ft from our shaft. The ground continues full of clay seams, which makes it necessary to keep the drift timbered close up to the face. There is a slight increase in the quantity of water. We have again been delayed somewhat in work by the hoisting of water for 3 days, owing to a break in Belcher pump beams.

**CALIFORNIA.**—The pumps have been run an average of 21 hours per day, consuming 8 cords of wood per day. Have pumped water for the Belcher company the entire week. The Forman shaft has been sunk and timbered 15 ft; total length, 1,730 ft. The rock is very hard and short, and work is badly.

**OVERMAN.**—The east drift, 2275 level, has been extended 35 ft; total length, 280 ft. We have bailed water with the tanks 78 hours for the Belcher company. The Forman shaft has been sunk and timbered 15 ft; total depth, 1,730 ft. The ground continues very hard and short, and does not blast well.

**SAVAGE.**—Have been engaged during the past week in relieving timbers in incline, in repairing the drift south from the 10th level station, and in driving west on the 2100 level.

**C. N. S. SHAFT.**—Still engaged in bailing water and in putting in pipes for hydraulic pump.

**KENTUCK.**—Repairing the old shaft, preparatory to renewing operations in the mine.

**G. & C. AND E. & B. SHAFT.**—Excavating bob-pit and making excellent progress.

## BRISTOL DISTRICT.

**DAY MINE.**—*Pioche Record*, Feb. 12: A. S. Gould, Supt., informs us that on Monday he will ship sample of ore to Bullionville for the purpose of having them test it and see what they can do. There is no telling at what ancient period the Bristol mill will start up.

## CORTEZ DISTRICT.

**BULLION.**—*Silver State*, Feb. 9: S. Wenban, of Cortez district, near Beowawa, has struck another bonanza in his mine. Yesterday he shipped West, by express, 25 bars of bullion, valued at \$33,000. Mr. Wenban sticks to Cortez through ill and good report, and makes money by doing so, though experts who visited the district some time ago pronounced it worthless.

## CENTRAL DISTRICT.

**ENCINO ARROYO.**—*Silver State*, Feb. 8: S. W. Hammond brings very good news from the Central district. Several miners are at work on their claims, and taking out more or less ore. The Keystone mine, owned by R. V. Craig and C. W. Cook, is producing very rich ore, and considerable of it. They are down 180 ft on the ledge, and in one of the levels they have a ledge 14 ft wide, 8 inches of which will average \$200 to \$210.

**NORMAN GILBERT.** is at work on the Railroad mine, the largest ledge yet found in the district. The ore is principally argilliferous galena and antimony. This he roasts in a reverberatory furnace, and then treats it by the leaching process.

**THE MYRLE.** owned by S. W. Hammond, is the richest in the district. The ledge is small, seldom exceeding 1 ft in thickness, but it pays well. Assorted ore works about \$2,000 to the ton.

**J. F. CLARK.** is building a mill on the Humboldt to work the Loomis and Railroad ore. He has the frame of the building completed, and will probably get it in running order next spring. It is to be run by water power.

## DUN GLEN DISTRICT.

**CLOUGH.**—*Silver State*, Feb. 8: John Wright, of Dun Glen, informs us that the late rains washed out the road through Dun Glen canyon so badly that teaming is suspended. The Long Sync mine and mill are closed down for the present, and the Superintendent, Dr. Loomis, has gone west to purchase pumps and a hoisting engine. The mine is looking splendidly, and below the tunnel level the ledge is larger and richer than it has been above that level. To work it, however, it is necessary to get an engine to pump out the water.

## ESMERALDA DISTRICT.

**DEL MONTE.**—*Esmeralda Herald*, Feb. 12: On Saturday last the nose place of the balance-hob on 300 level broke and fell. This caused a delay of several hours, during which time the haulage was removed from this hob to the other two. The water came over the 800 level but was speedily lowered, and the pump handled it without difficulty.

culity assisted by one tank. Work in the drift on 800 level is progressing very favorably.

**EVA CON.**—Work progresses in the shaft. Ten ft have been accomplished this week, making its total depth about 50 ft. The ore has changed for the better, and in the bottom looks very well.

**CENTRAL.**—The work of developing this valuable property still goes on. Preparations for opening the mine thoroughly in the spring are being made.

## EUREKA DISTRICT.

**PREMIER.**—*Sentinel*, Feb. 12: The work of grading the ground for the machinery of the Eureka Con. still continues, and the ground will soon be ready for it. In the meantime work in the new shaft has been entirely suspended, and will not be resumed until the machinery is in position to control the flow of water.

**A DISPUTED POINT.**—Ever since Joe Potts vanguarded the Richmond with stink-pots the soul of Wm. Harris has been bent on revenge, and on Thursday night he proceeded to carry his cherished scheme into effect. All the articles generally used for such purposes were brought into requisition, and a stench powerful enough to have sickened his satanic majesty was driven toward the conclusion by the powerful air compressor of the Richmond. But the Albion folks closed the aperture, and the Richmond received the benefit. Joe Potts is now cock of the walk, and says if they propose to settle the disputed point with stink-pots they can count him in.

## GRANTSVILLE DISTRICT.

**THE CENTENNIAL.**—*Bonanza*, Feb. 12: Work on this mine goes on with increasing and flattering results. The entire shaft is in ore, and a careful examination of the bottom shows it to be of a better quality than any yet obtained, and further shows that the same improvement in quality is met with as depth is gained. There can be no question but that this company has just entered a large body of ore, and that in the next 24 ft rich developments are expected.

**THE ALEXANDER.**—In the Alexander the work goes steadily on, the slopes producing the usual quantity of ore. The work of sinking the incline progresses satisfactorily, and everything is in a prosperous condition.

**THE BROOKLYN.**—The Brooklyn continues to send out plenty of fine ore to run its stamps, and more if the stamps are in the mill. An incline will soon be started in the bottom to go for another level.

## LEWIS DISTRICT.

**MINER'S UNION.**—*Silver State*, Feb. 12: The miners in Lewis district, whose wages were reduced to \$3 per day and per week for board, have organized a Union. Following are the officers elected: Wm. Tophill, President; F. Bartlett, Vice-President; D. T. Holmes, Secretary; I. W. Finley, Treasurer; I. Knight, Warden; H. Roscoe, Financial Secretary; H. Darey, Conductor; M. McCormick, T. Baker and M. Roscoe, Financial Committee; James Tomahat, Outside Watchman. The officers were installed by a member of the Austin Union.

## PIOCHE DISTRICT.

**BULLIONVILLE WORKS.**—*Pioche Record*, Feb. 12: Work is being steadily pushed ahead on the furnace, which will soon be completed. Thiefturce, although a water-jacket, is very different from that erected by the Hillside Co., and is of an octagon shape. During the week the greater portion of the machinery in place has been tested, and one or two slight alterations will probably have to be made.

**THE 24th of January** was the time on which the Raymond & Ely Co. was to hold its annual election, but, as we have failed to hear anything about it, we presume that the unworthy Board of Trustees of that company failed to meet. We have the very best of reasons for believing that the property of the company will fall into the hands of Lazard Freres, and that the much talked of suit brought by Mr. Walker will probably be dropped; and as the French do say, then "We will see what we will see."

**HICK MILLS.**—Henry Raymond's mill is now all in readiness, with the exception of some slight articles, and the whistle, indicating its starting up, we to have been blown on Wednesday last. There is quite a lot of ore on hand.

## SILVER CANYON DISTRICT.

**RUNNING.**—*Ward Reflex*, Feb. 12: J. C. Campbell, who arrived from Silver canyon Monday last, informs us that Wm. Sheek, for a long time in charge of the 6-stamp mill at Cherry creek, is running Dr. Brooks' mill at Silver canyon. When Mr. Campbell left for Ward on the 30th of last month there was between 500 and 600 lbs of amalgam ready for the retort. One from the Sadie L. reaches the mill by the Blue Bell. When the snow goes off the Blue Bell mine will come to the rescue. Forty-three men are at work in the canyon.

## TAYLOR DISTRICT.

**ORE.**—*Ward Reflex*, Feb. 12: In the Selfcocker mine, Taylor district, Mr. W. R. Thomas informs us, a large body of first-class ore has been struck by McComie & Murphy, who are doing their best to get the claim. They are now sinking on it. The ore is of the same character that Garrothers & Garaghan shipped to Salt Lake for reduction.

## WARD DISTRICT.

**MARTIN WHITE.**—*Reflex*, Feb. 12: A small body of ore was cut in the 2900-ft crosscut in the Martin White tunnel Monday last. It looks like the top had been cut through and that there is a body of ore below.

## ARIZONA.

**PIONEER DISTRICT.**—*Pinal Drill*, Feb. 12: In the New-leader work is going on under contract, to sink 30 ft deeper, which will make the shaft 100 ft deep.

**TURNER.**—The Turner, formerly known as the Athens mine, is now worked at a depth of 76 ft in the shaft, and 33 ft in the tunnel. They have cut the vein in good ore.

**PIKE.**—The Pike mine is full of activity. The old shaft has been opened for exploration, and the lay of the metal ascertained so that a new tunnel is now under contract for 150 ft in length, and its mouth is on the low gulch, below the old tunnel. They will pierce the steep mountain at a great depth and open up a rich mine of silver-bearing galena ore, assaying nearly \$200 per ton.

**LEWIS.**—The work on the main tunnel is continued, and progressing rapidly. It is expected to reach the Lewis vein in 25 ft more. At 255 ft they are sinking a winze, which is now 9 ft deep, and all in good ore. In the tunnel the same rich ore is also found where they are now working. The assays of the Lewis run as high as \$1,200 per ton, and large quantities are in sight in the tunnel. The Lewis presents all the indications of a bonanza.

## IDAHO.

**WOOD RIVER.**—*Cor. Idaho Statesman*, Feb. 8: Several good prospects have been discovered near Bellevue since the snow fell. One claim, owned by John Walker and Thomas Hort, is being opened and shows a ledge of galena and cerussite about 4 ft wide, much of which will assay from \$300 to \$500 to the ton. This ledge is situated on the hill east of this place, and only about 1 mile from town. Several other claims on the same mountain are being worked with good prospects. Among them is the Town View, being worked by James Dillinger and others, who have leased it. They have several tons of ore already sacked out, and will yield from \$500 to \$700 per ton. These are the first claims that have been opened on the east side of town. Several small snow-slides have occurred in the mountain west of here and around Bullion, but, as yet, no one has been injured by them.

**A LUCKY STRIKE.**—*Yankee Fork Herald*, Feb. 14: The Andy Cremer tunnel right, situated a few hundred yards above Rocky Bar, Alturas county, was purchased by Resner & Settle and the vein was found on 300 to 400 ft long, 15 ft, where a 2-ft vein of ore worth from \$60 to \$100 was struck. Mr. Cremer had been at work on the tunnel for 17 years, and sold it for the insignificant sum of \$500. The vein tapped is supposed to be an extension of the Idaho

and Vishon mines. The Idaho and Vishon mines have been worked at different times, and immense quantities of bullion have been shipped from them. The mine was tapped by the tunnel at the depth of 300 ft, and there is enough ore in sight to keep a 10-stamp mill running for at least 2 years.

**CRUSHING COMMENCED.**—The Custer mill commenced crushing in earnest last Wednesday, and has been running night and day since, and will be successful in keeping pounding away without cessation. Everything is now working to a charm, and big clean-ups are looked for. The roasters are more than meeting the expectations of the builders, and the ore is being chloridized up to over 90% of the assay value. The bullion is 950 fine, which is high. The shipping of it will commence inside of a week.

**BOISE BASIN.**—*Jonas W. Brown, Esq.*, writes us in a private letter from Idaho City that there is now more snow throughout Boise basin than there was last winter, which insures a good placer mining season.

**YANKEE FORK.**—The usual force of 70 men will resume work in the Custer and Unknown mines in a short time. Most of them were "knocked off" a short time ago, all the ore houses, stopes, tunnels and every place being full of ore. The largest mine, which is on the Charles Dickens vein, is looking better than ever before. The sounds of blasts can be heard at any minute of the day, showing activity in all of the mines. The tunnel running to tap the Badger mine, on Custer mountain, is being pushed ahead with all possible speed. The mine is owned by R. C. Chambers and others.

## MONTANA.

**ANSELMO.**—*Butte Miner*, Feb. 8: The Anselmo continues to improve with the attainment of depth, and is one of the main mines of this district. Mr. Hughes, who prospect one year ago, is now regarded as a fortunate and valuable property. The east shaft is being steadily pushed to the deep and shows in the bottom a well defined ore body 4 ft wide and assaying across the vein \$250 per ton. The shaft is 210 ft deep. At a depth of 170 ft east and west drifts have been extended to a total length of 85 ft. The vein, though a ft less in width than at the 60 level, is producing a quantity of excellent quality, the sample last taken assaying \$180. The vein is being sunk as fast as the hoisting capacity of the winze will permit, and yesterday reached a depth of 150 ft. Before the end of the month it is the intention of the lessee, Joseph Lacaff, to have steam hoisting machinery in operation. The boiler has already arrived, and the engine and pump are en route from San Francisco.

**LEXINGTON.**—Although very little information concerning the Lexington finds its way into print, it is gratifying to know that the development of the mine is proceeding uninterruptedly, and that the results are of the most satisfactory character. For 3 years the Lexington mill has been running continuously and profitably on ore from the 80 level of the mine, and there are yet large reserves of pay ore available for extraction. For the past few weeks a new chute of ore not previously developed has been coming largely to the dry stack production. The new ore body is 6 ft wide, and is sufficiently rich to insure handsome returns.

**MOUTON.**—The main shaft yesterday attained a depth of 140 ft. The 2-ft "feeder" recently encountered has dipped south. Another one, showing equally rich ore, came into the shaft several days ago. Three shifts of men are employed, who sink between 24 and 3 ft per 24 hours. The hoisting works building is completed.

**BIG WORK.** continues on this property with an activity characteristic of the owners. The face of the east drift, from the bottom of the winze shaft, is being forwarded on a wide and well defined body of first and second class ore. The former is being sacked for shipment East, and the latter is left on the dump, where it will remain until the erection of the projected smelting works. From the winze, midway between the two shafts, on the 60 level, exceptional high grade silver-copper ore is being extracted which glitters with native silver, and is sufficiently rich in copper to pay all expenses of extraction, transportation and reduction. The necessary steam hoisting machinery will soon be imported and placed in position.

**ALICE.**—Supt. Hill is very well satisfied with the condition of the mine and the operations of the mill, though the latter is now being repaired, and the mine have not yet been perfected. The mine is now producing upwards of 60 tons per diem from the several levels. It is being mined on the ore floor in certain proportions, and excellent results in the way of fine bullion may be expected within a few days.

## OREGON.

**TWO MUCH WEST.**—*Democratic Times*, Feb. 4: S. C. Carter informs us that the ditch of the Grand Applegate Co. has been considerably damaged by the storm, and it will take much time and money to repair it. In some places not a sign of it remains, having been filled up with debris. The Squaw Lake Co.'s ditch is intact, however. Even the minor creeps and complaints of the superabundance of water for once. Ditches, dams, etc., have been damaged considerably in these instances, but the injury has generally been repaired soon and the work expended for a very short time only. At present writing nearly every miner in Jackson and Josephine counties is busy and improving his opportunity. A correspondent of the *Times*, under date of the 27th ult., says: "I think the water was higher in this section than we have any account of. The damage to the mine is light, but most of their ditches were damaged some of them. A. J. Fanky on Star Grove creek seems to be the heaviest loser. He built a breaker in the creek, in order to protect his works in the bank, but the water washed it out, with his flume, and filled up everything. His loss is put at \$250. He has gone to his farm in Sam's valley and will wait till spring to re-open his claim. The head of the Rising Star Co.'s ditch on Wolf creek was washed away. Damage about \$50."

**TUNNEL.**—Operations on Shumpp & Co.'s tunnel, in Willow Springs precinct, have been suspended for the present, but will be resumed at an early date.

**TAILINGS.**—The accumulated tailings of years have been swept from the dumps by high water, which has been a benefit to the miners who have often been discommoded by them.

**MINES.**—Since the organization of Josephine county 900 locations of quartz and placer mines have been made, the Galice Creek district heading the list with 264. The total number of transfers has been 239.

**NUOGOT.**—*Joia Saltmarsh*, of Youdas & Co., Sterling, picked up a neat nugget of gold, worth \$40, last week. The company is taking advantage of the water supply and making the dirt fly, as are others on the creek and elsewhere.

**NORRIS.**—Miners busy. Plenty of water everywhere. K. Boze is mining some new diggings near his place on Applegate with good success. Beck Bros.' dam on Applegate has again been washed out, but, with commendable pluck, they will try it over again. Barkdell & Kline, at Blackwell, are now working placer diggings, but will resume operations on their quartz ledge early next summer.

**FROM THE MONTANA.**—*Democrat*, Feb. 4: The Supt. of the firm of Back & Block of this city, returned from a trip to the Granite creek country last Monday. He visited the Monumental mine, and on his return Mr. Chas. Miller, superintendent, entrusted him with the care of two silver bricks, one valued at \$1,874 and the other \$1,801, to be brought to this city and shipped to the smelting works at San Francisco. Mr. Back reports the mines generally in that section in a flourishing condition.

## UTAH.

**PARK CITY NORRIS.**—*Salt Lake Tribune*, Feb. 12: The smelter will start up about the 15th of February. The Ontario company contemplate sinking a new shaft on the Last Chance ground, on the hill west of the present works. It will be larger than the present new shaft, to accommodate the monster Cornish pump which will be put in. The strike in the Rebellion is improving rapidly. The raise has been run over 90 ft, in ore all the way.



## Silver in Sedimentary Rocks.

(CONTINUED FROM PAGE 114.)

physical or chemical conditions for absorption are unfavorable in the same proportion will the rock be poorer in ore.

It would explain the preponderance of silver in one portion of the triassic sandstone, and of copper in another portion; viz., they came through different fissures and from different sources below.

It would explain the impregnation of the sandstones even at considerable distances from the larger bodies of ore. I have already cited the common occurrence of lateral impregnation of the country rock on either side of fissure veins. In the same way from the main channels in the sandstone the lateral impregnation of the body of the rock, even to considerable distances, would take place.

Mr. Cazin objects to this theory (and considers the objection fatal) that the ore deposits are not local, but extend over Utah, New Mexico, etc., and hence they cannot be dependent upon local fissures; and, furthermore, that it is characteristic of the triassic sandstone that it is not fissured.

In reply I would say that, if the ore deposits are not local, neither are the igneous rocks local; and that according to Mr. Rolker the two go together—i. e., the larger or more pronounced concentrations are in the neighborhood of crystalline rocks. In the second place, I am compelled, on general principles, to doubt Mr. Cazin's statement concerning the absence of these fissures over such an extensive district. The greater portion of the juratriassic area between Leeds district, Utah, and the Nacimiento mountains, New Mexico, is deeply covered by later sedimentary rocks, exposed only in places in the deep canyons of the rivers which drain the country. Even these exposures have not all been investigated to prove either the presence or absence of silver or copper ores. One cannot speak, therefore, of an universal impregnation of the entire triassic sandstone, nor of the absence of fissures over that whole area.

Finally, concerning the existence of fissures in those places which have been explored, neither Prof. Newberry nor Mr. Cazin recognized any fissures; but Mr. Rolker has discovered the key to the whole problem when he recognizes the

## Existence of the Ore Channels

At the Stormont mine, and properly explains them, viz.: During the disturbances attendant upon the eruption of the neighboring igneous rocks, the sandstones were fractured without opening. Instead of producing open fissures to be subsequently filled like ordinary fissure veins, the result was the formation of cracks, along which, from the friable nature of the sandstones, the rock would be considerably crushed, and might, later, partially heal up. But the ultimate result would be the existence of numerous

## Vertical Channels or Water-Ways.

Which would certainly be followed by metal solutions forcing their way upwards. These water-ways would finally contain the largest amount of ore, and would form the ore channels which Mr. Rolker describes, and from them the lateral impregnation of the sandstones, even to considerable distances, would be easily effected.

These water-ways would branch and ramify through the rock in all directions, never making themselves visible on the surface as fissure veins, and, in fact, by the entire absence of all the usual characteristics of fissure veins, such as distinct walls, selvages, etc., would easily escape the observation of even such an acute observer as Prof. Newberry.

It is then by such a process as this that I would explain the wide-spread impregnation of the sandstone, so far as yet observed, and the apparent absence of fissures, as insisted upon by those who have written upon the subject.

The silver came into the sandstones, consequently, in the same general way that the silver came into the Comstock lode, or any other fissure vein, the present difference in the mode of occurrence being due to the fact that the fissures did not open, and that the sandstone absorbed the metallic solutions like a sponge, as fast as they came in contact with it.

## General Considerations.

The existence of water-ways was first suggested to me by a large and magnificent specimen of ore from the Bassick mine in Colorado, now in the museum of economic geology, of the University of Cal., presented about a year ago by Mr. J. B. Farish, then of Silver Cliff, Cal. The country rock of the Bassick mine is an igneous rock (sanidin trachyte) and the difference between their modes of occurrence at this mine and the Silver Reef mine is due entirely to the different nature of the country rocks. The trachyte exists in the form of irregular fragments from the size of a walnut to many ft. in diameter, all more or less rounded and greatly decomposed by the action of infiltrating metallic solution which have deposited the ore between the fragments. Had the rock been any where nearly as porous as sandstone, we should have found here the same extensive lateral impregnation as at Silver Reef.

A subsequent visit to the Sulphur Bank quicksilver deposit, in Lake Co., Cal., disclosed precisely similar relations at that mine. There again andesite which forms the Bank has been irregularly fissured at the time of its original solidification, and subsequently infiltrated with metallic solutions carrying mostly quicksilver ore.

I have learned recently from Prof. Joseph Le Conte, that this idea of the widespread occurrence of water-ways has been suggested by him in his lectures on geology for the past two years, and that in the next edition of his geology he proposes to give it prominent place.

We are both convinced of the value of the suggestion. In fact, it is only by means of it that many otherwise puzzling deposits can be understood. It brings likewise, into close genetic relation, a large number of ore deposits which pass in the literature as impregnations, stocks, veins of substitution, irregular deposits, geyser deposits, etc., into genetic relation, not only with each other but with what must be regarded as the simplest type of them all, viz: the fissure vein.

It is certainly to be expected *a priori*, that the process of rock fracturing that accompanies every considerable disturbance in the mutual relations of rocks, for one fracture that is accompanied by the formation of an open fissure, many would be formed without opening, and through which metallic solutions could force their way upwards. The form of the resulting deposit would then depend upon the nature of the rock in which the fracture was produced.

If the fissure opened, we should have the simple fissure vein; if it remains closed and the rock was porous like sandstone, should have, as at Silver Reef, ore channels with very extensive lateral impregnation of the surrounding rock, if the rock was not porous like the Bassick and Sulphur Bank rocks, we should have comparatively thin veinlets ramifying in all directions accompanied, as it always is, by extensive decomposition of the rock, if the rock is very readily acted upon, chemically by the metallic solutions, as is the case with limestone, dolomite, etc., the softer portions would be dissolved, outforming huge caverns of most irregular form, which would subsequently become partially or wholly filled with ore, as at the Eureka and Richmond Consolidated mines in Nevada.

The ore deposits at Silver Reef and at the Nacimiento mountains are by no means the first sedimentary rocks containing sulphureted ores, which have been discovered. These beds are the first that have yielded any considerable amount of silver; but copper, lead and quicksilver, and even gold, have long been known in similar beds. I will mention but one or two localities; thus, at Voropatak in the Siebenbrunnen mountains, the Carpathian sandstones are impregnated with gold and quartz; at Bleiberg, in Carinthia, galena is found in limestone; at Bohmisch-Brod and Schwarzkosteletz, in Bohemia, the sandstone of the Rothleigenden formation of the Germans is impregnated with copper ores. The copper schist of Mansfield, at the base of the Harz mountains, is another instance, and many more might be mentioned.

I have studied carefully the geological relations of many such deposits, to see which of the above mentioned theories best explained the recorded facts. The theory which best explains the phenomena at Silver Reef is, likewise, the one which appears most rational for most of the others. With but a single exception (Comstock near Aachen in Rhenish Prussia), sedimentary rocks are impregnated only in the neighborhood of eruptive rocks. I will mention here but a single striking instance, the copper mines of eastern Russia. Central Russia is one vast, monotonous region of comparatively undisturbed sedimentary strata, perfectly free from sulphureted ores of all kinds. But as soon as we reach the extreme eastern edge, where the igneous masses of the Ural mountains have forced their way upwards through the sedimentary beds, there we find these same sedimentary rocks impregnated with ores of copper; while, in the immediately adjacent mountains, the same metal is abundantly present in the fissure veins of the eruptive rocks.

## Prospecting in Sandstone Districts.

One more point and I will close. It is the answer to the question I asked in my introduction. "Has the prospector any practical guide in his search for the precious metals?" I can only state what must still be considered as about the only law which is generally applicable to all mineral districts where the precious metals have thus far been mined, viz: that deposits of the precious metals occur almost exclusively in the neighborhood of the massive crystalline rocks.

Gold and silver may at any time be found in sandstones and similar sedimentary rocks, but only in the neighborhood of the massive crystalline rocks, and it is useless to prospect sedimentary rocks for the precious metals at great distances from such geological formations.

It is scarcely necessary to add that superficial drift deposits and all kinds of placer deposits, both recent and older, may form exceptions to the law as above stated.

A. W. JACKSON.

Museum of Economic Geology, University of California.

THE track of the Ruby Hill railroad, Eureka, is covered with ore that has fallen from the cars while en route for the furnaces. Chas. Mette, a lad of 14, has been collecting it. He will make not less than \$10 per day.

THE May Lundy Co. began work last spring and are now turning out from \$7,000 to \$9,000 per week with a five-stamp mill.

EDISON is the most promising man in the country. He doesn't make light of his promises either.

## Physical Studies of Lake Tahoe.—No. 8.

(Written for the Press by Prof. JOHN LE CONTE.)

## Rhythmical Variations of Level in Lakes or "Seiches."

As might be expected, the waters of Lake Tahoe are subject to fluctuations of level depending upon the variable supplies furnished by its numerous affluents. In mid-winter, when these streams are bound in icy fetters, the level falls; while in the month of May and June, when the snows of the amphitheater of mountain-slopes are melting most rapidly, the level of the lake rises, and a maximum amount of water escapes through its outlet. According to the observations of Capt. John McKinney, made at his residence on the western shore of this lake, the average seasonal fluctuation of level is about 0.61 of a meter; but in extreme seasons, it sometimes amounts to 1.37 meters. The lake of Geneva, in like manner, is liable to fluctuations of level amounting to from 1.95 to 2.60 meters, from the melting of Alpine snows. But besides these variations of level, due to the variable quantities of water discharged into them by their affluents, many lakes of moderate dimensions are liable to rhythmical oscillations of level of short duration which are, obviously, not produced by fluctuations in the supply of water. It is to this kind or species of variation of level, that our attention will be directed in the sequel. This interesting phenomenon was first recognized in the Lake of Geneva; but was subsequently found to be common to all Swiss lakes, as well as to those of Scotland. It is, therefore, a general phenomenon, which may be observed in all lakes of moderate dimensions. The inhabitants of the shores of the Lake of Geneva have long designated this rhythmical oscillation of the level of the water, by the term "seiche;" and this designation has been adopted by scientific writers.

These "seiches" were first signalized in the Lake of Geneva, in 1730, by Fatio de Duillier, who ascribes them to the choking of the flow of the waters of the Rhone on the shoal near Geneva by the force of the wind at mid-day. Addison and Jallabert, in 1742, supposed them to be caused by sudden increments in the discharge of the effluents, due to the augmentation in the amount of snow melted after mid-day; or to the sudden increase in the flow of the Avre checking the outflow of the water by the Rhone. Bertrand supposed that electrified clouds might locally attract and elevate the waters of the lake and thus produce oscillations of level. H. B. de Saussure, in 1799, attributed the phenomenon to rapid local variations of atmospheric pressure, on different parts of the lake. J. P. E. Vaucher, in 1802 and 1804, adopted de Saussure's explanation, and confirmed it by many excellent observations. He, moreover, established that "seiches" more or less considerable, occur in all the Swiss lakes; and that they take place at all seasons of the year, and at all hours of the day; but in general more frequently in spring and autumn. As regards the cause of the phenomenon, Vaucher showed how rapid local alterations of atmospheric pressure would produce oscillations in the level of the lake, and compares them to the vibrations of a liquid in a recurved tube or siphon. Finally, Arago maintained that "seiches" may arise from various causes and traced the analogy between them and certain remarkable oscillations of the sea, including those arising from earthquakes. But physical science is indebted to Prof. Forel, of Lansanne, for the most complete and exhaustive investigation in relation to the phenomenon of "seiches." This accomplished physicist began his researches in 1869, and has continued them up to the present time. He has been able to demonstrate that these rhythmical oscillations occur in nearly all of the Swiss lakes (he studied the phenomenon in nine of them), and that they follow in all cases the same general laws. Those of the Lake of Geneva have received the most elaborate and prolonged investigation. In March, 1876, Forel established a self-registering tide-gauge (*limnimetre enregistreur*), on the western shore of this lake, at Morges; and with the co-operation of P. Plantamour, another one was installed, in June, 1877, at Secheron, near the city of Geneva, at the southern extremity. Since these dates, these two instruments, have, respectively, been registering the oscillations of the level of the water of the Lake of Geneva; and they are so sensitive, as to indicate the waves generated by a steamer navigating the lake at a distance of 10 or 15 kilometers. From a most searching investigation of all of the phenomena presented by the "seiches" in the Swiss lakes, Forel deduces the conclusion that they are really movements of steady unidirectional oscillation "balanced undulations," in which the whole mass of water in the lake rhythmically ewings from shore to shore. And, moreover, he shows, that the water oscillates according to the two principal dimensions of the lake; thus giving rise to longitudinal "seiches" and transverse "seiches." They occur in series of synchronous oscillations of decreasing amplitude; the first wave produced by the action of a given cause, having a maximum amplitude.

## Amplitude of Oscillations.

The amplitude of the oscillations constituting the "seiches" is extremely variable. This, doubtless, arises from the fact, that the causes

producing the disturbances of hydrostatic equilibrium are extremely unequal in intensity, and variable in kind. In some exceptional cases, the amplitude of the oscillations, has been very large; thus, there are on record the following extreme fluctuations of the level of the lake at Geneva:

Observed by Fatio de Duillier, in Sep., 1600, 1.624 meters; observed by de Saussure, Aug., 1763, 1.481 meters; observed by Venie, Oct., 1841, 2.138 meters.

By amplitude is meant the difference in height between the maximum and minimum level of the water in a complete rise and fall. Thus in Venie's observation the water rose 1.218 meters above the mean level of the day, and subsequently fell 0.920 meters below the same level, making the amplitude 2.138 meters. Hence, we may say that the extreme amplitude of the "seiches" at Geneva fluctuates between 0 and 2.14 meters. In ordinary "seiches," however, it varies from 0 to 30 centimeters, or from 0 to 11.81 English inches. At Morges, the self-registering instrument indicated amplitudes within the limits of 12.5 centimeters, and 0 and 4.92 inches.

## Duration of Oscillations.

Like the rhythmical oscillations of a liquid in a siphon, the duration or time of vibration of any series of "seiches" at any given place and originating from a given cause is independent of the amplitude of the oscillations. In other terms, the time of vibration is approximately the same whether the fluctuation of level be large or small. But the investigations of Forel clearly prove, that the duration of the "seiches" depends upon the dimensions of the lake, and upon the mean depth of the water along the axis of oscillation. Thus, in a long lake, the time of oscillation of a longitudinal "seiche" will be longer, than that of a transverse "seiche;" while, on the other hand, in a deep lake, the duration will be shorter than in a shallow one. Hence, it follows, that every lake has its own period of oscillation for both its longitudinal and transverse "seiches."

The disturbances of hydrostatic equilibrium, which generate "seiches," may be produced by a variety of causes. Among these the following may be cited:

- (a) Sudden local variations of atmospheric pressure on different parts of the lake.
- (b) A descending wind striking the surface of the lake over a limited area.
- (c) Thunder storms, hail storms and water-spouts; especially when the accompanying winds act vertically.
- (d) The fall of a large avalanche or of a landslide into the lake.
- (e) And lastly, earthquakes.

Observations show, that the most frequent and evident of these causes are variations of atmospheric pressure and local storms. With regard to earthquake-shocks as a cause of such fluctuations of level, it is a singular, and significant fact, that since Forel has established the delicate self-registering apparatus on the shores of Lake Geneva, no less than 12 earthquake-shocks have been experienced in this portion of Switzerland; and they have had no sensible influence on these sensitive instruments. In fact, a little consideration in relation to the character of such shocks renders in highly improbable, that such brief tremors of the earth's crust, could have any agency in the generation of rhythmical oscillations of the whole mass of water in the lake. Indeed, it is very questionable whether any earthquake waves are ever produced in the ocean, except when the sea-bottom undergoes a permanent vertical displacement.

## Puget Sound Country.

The Seattle *Intelligencer* says: In this immediate vicinity, King, Pierce, Snohomish and Kitsap counties, covering an area of 5,000 square miles, the principal pursuits of the people are farming, timbering, mining, manufacturing, shipping and trading. The population is about 15,000, of whom about one-sixth depend upon the tillage of the soil; as many more upon getting out saw-logs, cutting them into lumber, etc.; as many follow coal mining and its transportation, upon steamboats and other crafts; and the other half upon the ordinary avocation of town life. We have no one overtowering industry. At present, lumbering is a business paying handsomely all engaged in it. The demand is for all the mills get out, and the promise is that they will soon be unequal to the strain upon them. The same is true of coal mining. Prices of coal and lumber are higher at this time than they have been for several years. The life in these lines of business has its effect upon all others—upon the farmers, the tradesman, the professional man and the capitalist. The times may truthfully be declared good. The country included within the area described contains hundreds of thousands of acres of Government land as fertile as one could wish. It is generally accessible. The principal market is found in Seattle, where there is a considerable home consumption, and from which large shipments are made by steamships to San Francisco. Hops, potatoes, oats and barley are what are chiefly exported. The best time for a man to come to this country is now. Work is plenty, and at remunerative rates. There is no room here, though, for men without principle, ambition and cash. We have more than enough of that kind already, and they make a pretty sorry living of it.

THE last bid for lead in Salt Lake was \$45.



## THE ENGINEER.

### The Railroads of the World.

From a volume published by the French minister of public works, entitled the "Album of Graphic Statistics," the *Saturday Review* has compiled an interesting article in regard to the railroads of the world. Taking the kilometer for the standard, it may be roughly estimated at three-fifths of a mile, or exactly .621 of a mile. In 1830 the total lengths of railroads in Europe were 316 kilometers, of which 279 were in England, and 37 in France. In the United States, there were 65 kilometers. In 1850, Europe had 23,083 kilometers, of which 10,656 were in the United Kingdom. Germany had 5,323, and France only 3,080. In the same year, the United States had 14,443 kilometers. In 1870, there were 104,120 kilometers, of which the United Kingdom had 24,999, very nearly one-fourth of the whole. But Germany, during the 20 years, had more than trebled her railroads, and possessed 18,560 kilometers. France had not been asleep, however, and had 17,924 kilometers.

In 1876, the United States had 84,637 kilometers, or about four-fifths of the mileage of Europe. In 1878, the increase in Europe was 50% over the railway system of 1870. Germany had then, it seems, the greatest lengths of lines in Europe—some 31,556 kilometers, while France had only 24,424 kilometers. The Germans, then, had much greater facilities in sending troops forward than had the French. This want of railroads in France may account for Mr. de Freycinet's railroad policy. Two years ago, according to the French authority, we had 131,682 kilometers of road. In comparing the length of railroads with population, Sweden is the best provided of any of the European states, having 1.03 kilometers for every 10,000 inhabitants.

Taking the mean in Europe, it is 5.3 kilometers for every 10,000 inhabitants. The United States is prodigal with her railroads, having 39.9 kilometers to every 10,000 people, six times more than the European mean, for the reason that we build roads to attract population, thus "reversing ordinary European ideas that railways should attend traffic, not go before it." For comparison of kilometers to area of kilometers of surface, Belgium has 13.5 kilometers of road, Germany 5.8, France 4.6, the mean of Europe being 1.7, and, strange to say, the United States mean is about the same as the European one.

From the statistics, the English reviewer seems to think that outside of England, Holland and some few minor European countries, railroad construction has hardly commenced, and that if the world is only at peace for a short period, railroad building will shortly take a fresh start of activity, and once more give rise to a brisk demand for iron and steel.

### The Isthmus Ship Railway.

Capt. Eads is a good persuader. His remarkable scheme of a ship railway across the Isthmus of Tehuantepec is taking a tangible shape. The Mexican Government has made a very liberal concession, giving him the right to construct a railway on such line as he may select, the work to be commenced within two years and completed within 12 years. He is allowed to charge \$5 per cubic meter of the displacement of each vessel transported; also \$15 for each passenger on the ship, and 1% on the value of coins or precious stones carried. The Government also gives him a subsidy equal to 1,000,000 acres of public lands, and makes other liberal concessions. While this will go but a little way toward the estimated cost of \$75,000,000, it will doubtless assist Capt. Eads in raising money in the United States. He desires to have our Government guarantee 6% dividends on \$50,000,000 of the stock of the company in consideration of free transportation of Government ships, officers and soldiers, and the benefit which the proposed road will be to our commerce. This, however, will be difficult to obtain. The projected road is, if built, to be about 112 miles in length, while the proposed Panama canal will be 45 miles long; but the Tehuantepec route will save about 1,500 miles between New York and San Francisco over the Panama route, while the distance from the mouths of the Mississippi to California by Tehuantepec is 2,300 miles less than by Panama. The Panama canal and the ship railway are fairly in the lists as competitors, while the Nicaragua canal scheme is also being urged, and if all are completed, it will be all the better for the country.

**TUNNEL THROUGH THE PALISADES.**—Chief Engineer Katta is getting his machinery on the ground, preparatory to building a double track tunnel through the solid mass of rock known as Bergen hill, for the New York, Ontario and Western railroad. Its length will be 4,225 ft., and it will extend from Weehawken, on the Hudson river, westward to the Hackensack meadows at New Durham. The time within which this work is to be accomplished would have astonished people born before the era of modern engineering, as the contract says all must be complete one year from date, November 19, 1880. The eastern approach cut measures 150 ft.; the tunnel proper, 4,225 ft.; western approach cut, 2,700 ft. The earth cut comprises 131,000 yards; loose rock, 9,000 yards;

solid rock, 44,500 yards, exclusive of 79,607 yards on the tunnel proper. Length of tunnel, 20 1/2 ft.; width, 27 ft. The shafts, five in number, involve 2,103 ft. of rock cutting; area, 7 x 15. The track will rise 25 inches per 100 ft. to a point near the meadows, and then fall 40 inches per 100 ft. The new railroad will give a third route through the rocky barrier of the lower Hudson, of which the Delaware, Lackawanna and Western and the Erie are the first two.

**MINING UNDER THE SEA.**—A number of English coal mines are being worked under the ocean. In Northumberland, Eng., the net available quantity of coal under the sea is estimated at 403,000,000 tons, and on the Durham coast under the sea, including a breadth of 3 1/2 miles with an area of 71 square miles, 734,500,000 tons. The latter mine is in a vein of an aggregate thickness of 30 feet, distributed in 6 seams. Engineers are considering how it can be worked successfully in the future.

## USEFUL INFORMATION.

### Luminous Paint.

According to the London *Building News*, luminous paint is getting into quite extensive use in England. Mention is made of offices coated with the paint, which give great satisfaction to the occupants. The effect is that of a subdued light, every object in the room being clearly visible, so that in a room so treated one could enter without a light, and find any desired article. The luminous paint is excited by the ordinary daylight, and its effect is said to continue for about 13 hours, so that it is well adapted for painting bedroom ceilings, passages that are dark at night, and other places where lamps are objectionable, or considered necessary. For staircases and passages, a mere band of the paint will serve as a guide, and costs but a trifle. For outdoor purposes the oil paint is used, but for ceilings and walls, the luminous paint, mixed with water and special size, can be used the same as ordinary whitewash, and presents a similar appearance in the daylight. By the recent discovery that it can be applied as ordinary whitewash considerably expands the field of its usefulness. Sheets of glass coated with the paint are in use in some of the vessels of the navy, at the Waltham powder factory, at Young's paraffine works, and in the spirit vaults of several London docks; and now that, by increased production and the use of water as the medium, its cost is reduced by one-half, it will probably be extensively used for painting walls and ceilings. The ordinary form of oil paint has already been applied in many ways to statues and busts, to toys, to clock faces, to name plates and numbers on house doors, and to notice boards, such as "mind the step," "to let," etc. The paint emits light without combustion, and, therefore, does not vitiate the atmosphere. Several experimental carriages are now running on different railways, the paint being used instead of lamps, which are necessary all day on account of the line passing through occasional tunnels.

**SPONTANEOUS COMBUSTION OF WOOD.**—The *American Journal of Science* gives a remarkable instance of the spontaneous combustion of wood. A Mr. Adam Reigart, two years previous to the occurrence, received a piece of wood, supposed to be cedar, detached from a large piece dug up 39 ft. below the surface, near Lancaster, Penn. The piece weighed a few ounces, and it was broken in two and laid upon a white pine shelf in Mr. Reigart's counting room. About four days before the discovery of the fire he had occasion to wipe the dust from the shelf and from the piece of cedar, with a wet cloth. Three days after it was discovered that the piece of wood had ignited and combustion was proceeding so rapidly that in a few minutes the shelf would have been on fire. Probably another prolific source of our forest fires is to be sought in the liability of decayed wood, not only to spontaneous combustion, but from the direct rays of the sun. At Winchester, Conn., some years since some workmen, about 2 P. M., on August 5, discovered smoke arising from a barren upland. The sun was excessively hot at the time. When they went to seek the origin of the smoke they found that the remains of an old decayed hemlock log had burst into a blaze, and were burning fiercely.

**TO CURE A SHEEP SKIN.**—To clean the wool on a sheep's skin and to cure the skin.—Nail on a board stretched, wool out, and scour with good soap suds and fuller's earth until properly cleansed. Then rinse thoroughly in hot water, and comb. Nail, wool down, stretched taut on a board, rub in plenty of salt, stand in warm place, and finally scrape off the softened inner membrane with a blunt knife. Then rub in plenty of moist alum powder, and let it stand several days or a week in a dry place. Soften, if desired, by rubbing with hot flour paste and the yolks of a few eggs, or with plenty of oil.

**A POWERFUL QUINQUET.**—Says Senator Beck: "Scott, Garrett, Huntington, Gould and Vanderbilt, the five railroad magnates, can sit down, and in a five minutes' chat fix a tax of \$200,000,000 upon the commerce of this country by raising freight two cents a bushel, and do it according to law."

### The New Tanning Process.

The Edlington Chemical Company, of Scotland, have been for some time actively engaged in perfecting the new tanning process by bi-chromate of potash. The leather which they have produced appears to be a very serviceable article. The *Scottish Leather Trader*, says:—We have seen a fine sample of strap butts, from native hides, where the fiber had thoroughly absorbed the tanning, and to anything but an experienced eye had all the appearance of an ordinary tannage. The color was good and the butt mellow; also a sample of crupper, of which the tanning and currying are thorough, and there seems nothing to prevent it suiting all the purposes for which this kind of leather is used; also a sample of calf which seems to us perfect and scarcely to be distinguished from the best home dressed. Samples of the tannage have been submitted for analysis to Dr. Clark, the city Analyst of Glasgow. These samples were bends of foreign and native pelts, butts, buffalo hides, and calf skin. The object of the analysis was to ascertain the total quantity of chromium which they contained, and the amount which was extracted by the action of water under different circumstances.

The result of the analysis and examination is reported as highly satisfactory. The leather was also submitted to Mr. Kirkaldy of the testing and experimenting works, Southwark, London, for the purpose of ascertaining the tensile strength of chromotanned vs. bark tanned leather. The results of the experiments showed that the chrome leather exceeds bark in strength, and that after it has set under the necessary stress it still retains an extraordinary amount of elasticity, which is available for tightening machinery belting or pulleys. For instance a piece of chrome leather, bore an ultimate stress of 3,297 lbs. per square inch, while a piece of bark leather only bore an ultimate stress of 2,672 lbs. per square inch, which proves the samples of chrome tanned to be stronger than bark tanned by 15 per cent.

**PALMETTO PARCHMENT.**—People of the Southern States discovered that smooth, strong and pliable parchment can be manufactured from the palmetto of Florida and other Southern States. The parchment can be washed, rubbed and handled just like cloth, and the writing will not be effaced. It can be cheaply manufactured, and is likely to come into general use for conveyances, land office receipts, etc. As much as 60% of the weight of the palmetto can be utilized in paper making.

## GOOD HEALTH.

### Fool Boys.

The Callow Youngsters who Puff Cigarettes.

Physicians and moralists alike are pained by the spectacle, growing more common every day, of pale-faced lads, ranging in age from 16 to 20 years, who are puffing their little lives away in cigarette smoking. Day and night they throng the streets, where the peculiarly offensive odor generated by cigarettes made of cheap paper and had tobacco renders their smoking as obnoxious to others as it is hurtful to themselves. Every evening before the doors of the theaters, they raise a cloud of foul smoke that is equally injurious to their own rickety constitutions and to the noses of their victims. Doubtless, also, they carry their pernicious habit into their homes—when they are old enough to do so without risk of the spanking they deserve—thus still further doing harm to themselves and making other people uncomfortable.

The cheap cigarette is a modern invention, and a peculiarly vicious one. Twenty years ago, when the cigarettes all came from Cuba and were wrapped in rice paper, smoking them did no great harm. Moreover, being made of Honduras, or some brand of equally strong tobacco, only a boy of stout stomach could smoke more than two or three of them at a time. But to meet the hoyish demand cigarettes are sold nowadays both cheap and weak. They are made of mild, often had tobacco, and for the most part they are wrapped in ordinary white paper. Rice paper wrappings necessarily increase the cost, and the boy who wishes to prove by the ordeal of smoke that he is not a boy but a man, much prefers the article that he can get the most of for his money. Moreover, the hoy does not know the difference apparent to the sight between rice paper and ordinary paper, any more than he knows that while rice paper burns away with scarcely any smoke at all, common paper burns with a foul smoke that cuts like a saw into the chest and throat. So he spends his money on cheap cigarettes and makes everybody around him uncomfortable while he humbles himself away into an untimely grave.

Of course, the boys do not intend to sin against themselves and their neighbors. They do not realize what a bad smell their nasty little cigarettes make, and they are very far from knowing what serious injury the smoke from them inflicts upon their throats and bronchial tubes and lungs. They smoke in innocence, not knowing what they do, but most earnestly believing that their smoking makes men of them. Down in the depths of their hearts the most of them have no sincere affection for smoking; and in the depths of their stomachs, they not unfrequently entertain a feeling of positive aversion toward it. But they hang on to their pestilent habit with a persistency that, in a bet-

ter cans, would be worthy of all praise, stiling the dictates of conscience and asserting a bad mastery over the rebellions of the flesh. And, if reasoned with, they answer in the words of dear John Leech's had boy, "But what is a fellow to do, when all the misu of his own age smoke?"

### Effect of Strong Drink on the Liver.

The *Family Physician* tells us that when alcohol is introduced into the stomach in the ordinary way, it nearly all passes through the liver. Undiluted spirits are much more injurious than when mixed with water, and produce greater irritation. Alcohol consumed as wine or beer is far less destructive to the liver than when taken in the form of ardent spirits. A hot climate intensifies all the vicious effects of alcohol. The symptoms of cirrhosis of the liver are in the early stages often obscure, but later they are sufficiently well marked. At first the liver gets slightly enlarged, and the patient suffers from pain in the right side, indigestion, wind and costive bowels. He is occasionally feverish, his skin is hot and dry, and he has a peculiar, unhealthy, sallow look, which he probably fails to notice, but which is sufficiently obvious to his friends. The necessity for making a change in his habits is forced upon his attention, and for a week or two he is under the doctor's orders, and not feeling able to drink any more, he consents to follow a restricted diet, and to take a course of purgatives.

Soon the most prominent symptoms are relieved, he fancies himself well again, and quickly returns to his old habits. Gradually, however, he notices that he is getting thinner and weaker, and occasionally he has a good deal of pain in the side. He is nervous and out of sorts. He has no longer the pluck he used to have; first his friends notice it, and then he gradually becomes aware of it himself. He finds that he is not "fit for business," and he is afraid to see people. The patient has occasional attacks of diarrhea, his appetite fails, and the emaciation and debility increase. He tries all kinds of treatment, but never sticks to one for long at a time. He would give up the drink if he could, but he can't. His self-reliance is gone, the alcohol has stolen away his will, and he is utterly incapable of giving up the dangerous fascination. He will take an oath to-day that he will never touch another drop of spirit, and will probably break it to-morrow. Sometimes he wishes that some would lock him up in an asylum, or that by some chance or other he would have six months' imprisonment, but he never feels able to put himself under restraint. After a time the liver gets smaller, and this, instead of being a good sign, is a bad one, for it is contracting. He would willingly enough consent to knock off drink now, but it is too late; the mischief is done, the liver is in a state of cirrhosis, and no medicine can restore it to its natural condition. Is there any remedy for this horrible complaint? Yes, one, teetotalism—absolute abstinence from alcoholic liquors of all kinds. This remedy must be applied early. If he waits until his liver has undergone serious organic change, it is too late. No half measures will suffice; he must give up drink of all kinds. If he does this he will recover; but if he goes on in his old plan an early and painful death is the inevitable consequence.

**SUGGESTIONS CONCERNING LONG LIFE.**—If any one could furnish the world with a medicine which would insure a long life, there is no end to the demand he would have for his drug. The *Herald of Health* thinks he would need many factories to make it, and many banks to hold the money he would receive. Fortunately, there is no such medicine, and so the world will have to get along in some other way. Some time ago the French government sent a circular letter to all the districts of that country to collect information as to those conditions of life which seemed to favor longevity. The replies were very interesting, but on the whole rather monotonous; and the general result was that longevity is promoted by great sobriety, regular labor, especially in the open air, short of excessive fatigue, easy hours, a well-off condition, a philosophical mind in meeting troubles, not too much intellect, and a domestic life. The value of marriage was universally admitted, and long-lived parents were also found an important factor. A healthy climate and good water were mentioned. All this agrees with common sense, unless the idea that the intellect is a hindrance to longevity be considered unreasonable, and we know that some of the most intellectual men have lived to great age.

**SODA FOR BURNS.**—All kinds of burns, including scalds and sunburns, are almost immediately relieved by the application of a solution of soda to the burnt surface. It must be remembered that dry soda will not do unless it is surrounded with a cloth moist enough to dissolve it. This method of sprinkling it on and covering it with a wet cloth is often the very best. But it is sufficient to wash the wound repeatedly with a strong solution. It would be well to keep a bottle of it always on hand, made so strong that more or less settles on the bottom. This is what is called a saturated solution, and really such a solution as this is formed when the dry soda is sprinkled on and covered with a moistened cloth. It is thought by some that the pain of a burn is caused by the hardening of the albumen of the flesh which presses on the nerves, and that the soda dissolved the albumen and relieves the pressure. Others think that the burn generates an acrid acid, which the soda neutralizes.





W. B. EWER.....SENIOR EDITOR.

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A. T. DEWEY.

W. B. EWER

G. H. STRONG

## SAN FRANCISCO:

Saturday Morning, Feb. 19, 1881.

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## The Week.

The rain has continued off and on during the week, but the rivers have fallen and the floods are over. It looks now as if there would be a scarcity of water for the hydraulic mines in the spring. Although we have had heavy storms there is little snow comparatively in the mountains, the warm rains having melted it; and the water supply in the spring will therefore be necessarily short.

The Legislature has as yet come to no conclusion in the debris question, and there seems to be a dead-lock, which retards legislative business of all kinds. No important measures have been passed this week. A summary of the work done will be found in another column.

News from the mines generally seem pretty good. In several places quartz mines have more surface water to contend with than usual, and have shut down. The wet ground and abundance of water have been good for hydraulic miners, however.

There seems to be trouble brewing with regard to miners' wages. In Silver Reef, Utah, the mines are closed owing to the refusal of miners to have their wages reduced from \$4 to \$3.50 per day. In Lewis district, Nevada, wages have been reduced to \$3.50 and there is trouble there. It seems to be Eastern companies which are urging this reduction, and miners' unions are opposing it.

Ice has again become an annoyance and nuisance in New York harbor and East river. While the fields are not as large as a fortnight ago, they are much thicker, and no ordinary boats attempt now to break a way through them.

THE bullion tax on the Comstock for the December quarter is a little over \$3,600; Con. Virginia being \$1,213; California, \$967; Union, \$502. Belcher and Crown Point are on for small amounts.

OWING to the impure air in the header of the Eureka, Nev., tunnel they can work but one shift in 24 hours at the present time.

## Oakland Harbor.

Work for the improvement of the harbor at Oakland, in San Francisco bay, is being carried on. Some idea of the extent of this great engineering enterprise may be better realized when we state that the two jetties, which are nearly parallel, extend from the shore line out into San Francisco bay a distance of 12,076 ft. This is 1,000 ft. longer than the jetties built by Capt. Eads, at the mouth of the Mississippi river, about which the public has heard so much.

The stone contract now under way at Oakland, contemplates raising both existing walls up to high-water level, by building a heavy dry-stone coping on its old walls as a foundation. The stones on this coping are being carefully placed in position, the stones weighing frequently from one to two tons each, the spaces between these large stones being carefully filled in with smaller sizes by hand, so as to make a good compact wall.

Where most exposed to the sea the crest is made eight ft. wide and with a slope of two to one, composed of stone carefully laid down to a point two ft. below low water.

The total amount of stone required to finish this present contract is estimated to be between 60,000 and 75,000 tons, the price per ton delivered and placed in proper position being \$1 and \$1.19, depending upon size.

The stone now being added to the walls is taken from McNear's quarry at Pedro Point, opposite the Sisters' lighthouse, at the entrance of San Pablo bay, whence it is brought in large light-draft barges, towed by a tug, and delivered at the site of the jetties at the rate of 8,000 tons per month. These barges are drawn up parallel with the walls at high water, and the rock is thrown on to the wall or wheeled down in position, according to this work being done. The men who are doing the contractors' work live in a floating barge, which is moored near by the scene of their labors. Work has gone on pretty rapidly this winter, as we have had smooth water so much of the time, few gales having occurred.

The object of raising the walls up to high water is to confine the ebbing tide from this inner harbor, more effectually than has been heretofore done by the low walls built during previous contracts, and which have permitted the best half of the tidal waters to escape laterally over their tops. This has, of course, lessened the scouring action of the ebbing waters, as they were not properly confined in the channel between the walls. On the very high tides a vast mass of water sweeps laterally across the jetties, and it is not until the tide has half fallen that the water can do what scouring is necessary to keep the channel clear. This lateral sweep of the water is dangerous for sailing craft during light winds, since instead of the tide taking them to the mouth of the harbor, it is apt to sweep them on to the north wall with the ebb and south wall with the flood tide.

The walls, as they have been for a few years past, might have been considered obstructions rather than aids to navigation. Being out of eight except at half tide, schooner men had to be very careful not to run on to them.

In addition to the stone work now going on, it is contemplated shortly to dredge out and widen the present deep-water channel between the jetties, so as to offer better facilities for navigation. The channel dredged out is now so narrow that steamers passing are crowded, and sailing vessels are apt to get ashore. It is confidently expected that the effort of raising the jetties to high-water level will be to maintain such a channel free from sandy deposit, no matter whether it comes from the inner harbor or from the wave action of San Francisco bay.

The work on this harbor has been going on under the direction of Lieut. Col. G. H. Mendell, U. S. Engineer, ever since its commencement in 1874, and the results have been very successful in developing the commercial value of this well-known sheltered and safe harbor, being one of the few such on the Pacific coast. Mr. L. J. Le Conte is the engineer, under Col. Mendell, in immediate charge of the work.

In 1874 boats drawing over five or six ft. of water could hardly bump along over the bar at high water and carry cargoes of not more than 60 to 100 tons.

Since 1878 ships and barks from 1,800 to 2,100 tons burthen have been running regular trips and drawing from 16 to 16.5 ft. of water. The completion of this year's work will admit of easy navigation for vessels drawing from 21 to 22 ft. of water, which is ample for most foreign vessels that come over the bar off the Golden Gate.

The Congressional Representative, Hon. H. F. Page, deserves credit for his perseverance and energy in disposing of the title question to the Oakland mud flats. This point was finally settled by the Attorney-General to the effect that the United States has supreme control up to the line of the salt marsh. The sum of \$50,000 was appropriated this year for this harbor, accompanied with the following proviso: "The same heretofore appropriated for this purpose, and unexpended, are hereby reappropriated; but the sums so appropriated and reappropriated shall not be available until the right of the United States to the bed of the estuary and training walls of this work is secured free of expense to the Government, in a manner satisfactory to the Secretary of War." This proviso

Mr. Page has endeavored to have struck out, on the ground that the question of title to the bed of the estuary had already been settled to the satisfaction of the Secretary of War by the elaborate opinion rendered by Attorney-General Davis last summer, which was conclusive as to the right of the United States to make the improvement—this being the only way the question could be settled, unless the Government should choose to authorize some one to bring suit against it. The enactment of the proviso, he said, would simply lead to a repetition of what was done last year, and with the same result. His motion was defeated by only three votes, and he therefore offered an amendment making this proviso applicable to all other improvements provided for in the bill, on the ground that Oakland harbor should not be treated as an exceptional case. This amendment was rejected by seven majority, and the subject was then dropped. Page's main object in offering this first amendment was to obtain an opportunity of placing the facts upon the record, and he accordingly got permission to print this Attorney-General's opinion as a part of his remarks for future reference. He is confident, as above intimated, that the enactment of this proviso will not delay the use of the appropriation.

## Reducing Ores.

Levi Stevens, of Washington, D. C., who, it will be recollected, was in San Francisco some years ago with a patent furnace for smelting ores by petrolum, has devised another process of reducing ores. There was considerable excitement at the time of his visit here, on the subject of low grade ores, and he sold rights to use his furnace, for an aggregate sum of \$40,000 or \$50,000, though it never came to anything.

His new furnace is triple in its character, by which it performs the threefold office of smelting, matting and roasting in one continuous operation. The products of combustion, after performing their function of smelting the ores, operate further summarily to mat and roast them.

In connection with this furnace he has a process of reducing ores by forcing superheated steam together with air through incandescent coal in a gas generator, thereby producing rapidly a large quantity of gas of high heating quality. This inflamed gas is conveyed in its highly heated condition immediately on to the ore.

A hot air chamber is placed in the top of the gas generator, and in connection with an air jacket, covering, or partly covering, the top of the furnace. Through the air jacket is forced atmospheric air, which serves to absorb the heat that would otherwise be radiated from the top of the furnace, and conveys it to the hot air chamber, from which it is discharged in the form of a hot blast, to perfect the combustion of the gases as they pass the bridge wall. The body of the furnace is made in the form of an inclined shaft, comprising, in sequence, a smelting, a matting and a roasting chamber. The bed of each of a series of shelves above the matting furnace is formed with openings, through which air is admitted, and through which, also, the ores can be moved from any shelf to the one below, and so on down, exposing the said ore to the action of the heat from within the furnace, and also to air drawn in through the openings, as they are moved from the upper to the lower shelves; and keeping each charge of ore separate from the more thoroughly roasted ore below, and the less thoroughly roasted ore above, until moved into the matting furnaces from the lowest shelf.

After the fire has been built in the gas generator or fire box, and the fuel is incandescent, ore is put in through a hopper. Superheated steam is injected into the ash-pit. This produces a powerful blast through certain parts, and the dry steam and air are forced up through the incandescent fuel. The steam is decomposed into its elements, thus aiding combustion. The hot products of combustion, at a turning point provided by the construction of the furnace, are met by a current of hot air. These joint currents, producing almost absolute combustion of the fuel, and multiplying the quantity of inflammable material by reason of the additional hydrogen, or carburated hydrogen, derived from the injected steam, thereby, the inventor says, giving to the incandescent gases, which are finally deflected upon the matted ore on the bed of the melting chamber, an intensity of heat, which only the most refractory substances can resist.

The products of combustion, having thus operated to melt the ore, continue on through a chamber where they mat the ore still on its way to the melting chamber, and next through another chamber, where they encounter air entering through other openings, which serve to ignite them afresh, thus aiding the operation of roasting. This accomplished, the gases pass into the chimney and escape, the inventor having done about as much with them as could be expected.

THE hydraulic claim formerly known as the Knickerbocker, just above Sargent & Jacobs' claim, at Quaker Hill, Nevada county, has made a clean-up of \$2,002, after a run of 20 days with one monitor. The expense was \$350, leaving a gain of \$1,650.

## Southern Inyo County Mines.

Resting Springs was formerly a halting-place on the old emigrant road a short distance from the Amargosa river, in Inyo county. About 1870, there were a great many stories in circulation about a famous mine supposed to have been found in the country somewhere in this vicinity. It was related that such rich ore had been found by an emigrant that he had made a gun-sight from a piece of native metal. Prospectors hunted all over the country, looking for the "Gun-Sight" mine—and some of them are hunting for it yet.

Some time in 1873, a mine was discovered which was supposed to be the Gun-Sight, and was so named. This mine was purchased by J. B. Osborn, and he and other Los Angeles capitalists have been working it ever since. They erected a smelter at Tecopa, and in 1876 had 1,200 tons of ore. For some reason the furnace operations were not successful. It was continually "freezing up." Finally they concluded to put up a larger smelter, which, however, met with no better success. A pulverizer was then put up at Resting Springs, but this did not work. Finally a 10-stamp mill was put up. About a year ago they began to run the Ward tunnel to tap the vein 500 ft. lower than the old lowest level; this will be at a depth of 800 ft. The tunnel is in 1,000 ft., and connection with the winzes has recently been made.

The mines in this vicinity have not been worked very vigorously, as they have all been waiting for the Gun-Sight to go ahead. The delay in vigorous work has run out about three sets of miners; that is, they have taken up the claims, worked them a while, and waited for the leading mine to prove its worth, so that attention would be attracted to the district. But the mill, since it was built, has never run more than two months at a time. The ore has been hoisted, but now they can get it out through the tunnel it is probable they will get out more.

It would seem as if the easiest way to get to Resting Springs was from Mojave Station on the S. P. R. R., and that will eventually be the way. Now, however, the principal travel is by way of San Bernardino, because the country along the road is settled. The mail comes to the district from San Bernardino but once a week.

In conversation with a gentleman recently from the district, we learn that the country thereabouts is full of mineral; besides the silver and gold, there are veins of galena, copper, iron, etc. The place is so isolated, however, and there has been so little to attract population that there has never been any excitement about it. A few wandering miners on their way to or from Arizona, look over the country a little, but it has never been thoroughly prospected.

The Gun-Sight mine, to which we have referred as the principal one in the region, belongs to the Los Angeles Mining and Smelting Company. They have worked the mine steadily, and paid for everything they had. No stock has ever been sold, nor have they tried to sell any. All supplies, labor, etc., have been promptly paid for, and there has never been any trouble in getting money from the company. The Gun-Sight above was galena; but when they worked further, carbonate ore was found, running from \$60 to \$4,000. It averages at the mill about \$80 per ton. About 40 men are employed at the mine, and there are about 300 altogether in the district.

The miners who own claims do their assessments every year, but not much more, apparently holding on for the big mine to make a stir. There is no custom mill to work the ores for the miners. On Gun-Sight mountain a few years ago was found a streak of black ore 100 ft. long on top and about four feet wide, lying on the surface. About \$30,000 was taken from this mass when it pinched out.

It is 20 miles from Resting Springs to the old Amargosa gold mines. The miners, years ago, took out some ore there, but the Indians came along and killed all the miners at the camp. The mines have lately been taken up again, and some work is being done.

A single mine has lately been found in a range about 75 miles south of Ivanpah, at the place where the last Indian war was carried on. The mine is on Providence mountain. It is being worked, but there is no mill as yet. They are taking out some rich silver ore. This mine is in San Bernardino county.

If the Gun-Sight mine at Resting Springs goes ahead steadily the camp will come out all right. Affairs have moved so slowly, however, that the patience of many has been worn out. The ore is soft and easy to work, going through the mill very fast. It contains some horn silver. In running the tunnel they have, of course, done a good deal of dead work, but the business of the company is managed on the same basis as a commercial one—in an economical and proper manner.

EXTENSIVE SHIP BUILDING.—Ship building on the Clyde was unusually active last year. Two hundred and forty-one vessels of all kinds were launched, of a total, officially, 239,000 tons, an excess of 71,000 tons over 1879. Their marketable value represents an outlay of about \$30,000,000.

A young man named Walford was killed on Monday at the Lyon Gravel mine, near Placerville. The car became unhooked and ran over him.



## The Alaska Mines.

## Description of the Newly Discovered Districts.

While the southern Territories of the United States are just now attracting a large share of attention from the mining community, the northern Territory of Alaska is also putting forth its claims as a mining region; and it is probable that the coming summer will see many prospecting parties in the field. Last year there was considerable prospecting done, but the winter of course, stopped work generally. It has been somewhat difficult to get any reliable news from the various camps which are being opened, and reports have been somewhat conflicting. We have received, however, from Mr. George E. Bilz, who is now at Sitka, a letter in which he communicates considerable information of interest concerning the mines; and as he has evidently personal knowledge of the matter, his statements are more direct than any we have received. Mr. Bilz's letter is as follows:

EDITORS PRESS:—I think it probable that as you have not heard for a long time from this part of the coast (Sitka), a few notes in regard to certain newspaper reports may be of advantage to the readers of the MINING AND SCIENTIFIC PRESS. During the past summer, feeling confident of the mineral wealth of Alaska, I fitted out seven different parties to prospect, each with six months' provisions and equipments. I also paid each party, which consisted of five or six men, regular wages; as otherwise I could not expect to have the prospecting of the country done to my own satisfaction.

The last of the seven parties returned in the latter part of November, and brought back to Sitka, on a canoe, about two tons of the richest quartz I ever saw in any country. I went up to this new El Dorado, leaving here on the 25th of November, and arrived there, on a canoe, on the 29th of the same month.

The district is called after the discoverer, "Harris district," and is situated on the main land of Alaska, between the Takou and Chilcat river, in 58° 28' north latitude and longitude 134° 10', within four miles of Stephenson's straits, opposite Douglas Island, on the northern end of Admiralty island.

The discoveries of the ledges and placers were first made on Gold creek, but since traced and found in Salmon creek and Glacier creek, five and seven miles northwest respectively, and in Sheep creek, three miles southeast. The same ledges and ores were found 30 miles southeast, and in Windham, Spruce and Sehug creeks, where, for the last five years, the placers have been paying well to a small lot of men. In Gold creek and its tributaries some 60 claims are now already taken up and staked out, and on all very encouraging prospects have been found. They may be called \$5 to \$20 diggings. But very little can be done there before April or May, as the men are not prepared to work yet, and are only getting ready and prospecting their grounds.

## The Ledges.

The ledge which made these placers are at the head of the creek, and cross the creek twice in a distance of about two miles. There is but one belt of them, which is about 3,000 ft. wide, and in it the six main ledges run parallel to each other, besides a number of smaller veins, but which are taken in by the main locations, as those are only about 300 to 500 ft. apart, and are from 6 to 30 ft. in width. These ledges, which show bold cropping for over three inches (so far as I have been on them), hold very regular in size and distance apart, and the whole length show the richest kind of ore. The quartz is imbedded in soft slate, and is quite decomposed and brittle. The gold is mostly free in the quartz, but the richest ore is in the galena, which is the only disadvantage of the ore, as I expect it will interfere with the amalgamation; yet the gold is quite coarse and very heavy, so that it will readily concentrate with the galena to be smelted there. I have made upward of a hundred assays, both fire and wet, and the lowest assay out of the very poorest piece of quartz yielded \$33 per ton, while the average of my assays which might be also called average of the ledges, are 285 per ton, and run from \$100 to \$5,000 per ton; and then I have never yet assayed any specimens.

The ledges were respectively called the Jamestown, Takon, Pilz, North Star, Montana, California ledges, and on each there are claimed already six locations of 1,500 ft. each, with plenty of ore on all of them. In the creeks lay thousands of tons of the richest kind of ore, every piece of which shows the gold plainly, and a good many of the placer claims are valuable for the quartz which lies on them.

## Water in the Creeks.

There is an abundance of water in the creeks as they are fed from eternal snow banks high up in the mountains, and there were on the 15th of December, all of 3,000 inches running, which is the lowest water of the year. There is nothing to prevent working these mines the year around. As far as this (January 18th), in the season, we have had only six days of frost, and now there is no snow as far as 1,000 ft. above sea, and it rains a good deal, of course, in the high mountains. It snows in the higher mountains.

The country is thickly timbered with red and black spruce, black pine, hemlock, alder and red birch, not so tremendously thick as on the

island, as there is 100% more moisture on the archipelago than on main-land.

The way to it is very easy and any large vessel can sail to the mouth of the creeks and anchor within 200 ft. of the shore. Already I had a 150 ton steamer up there, taking up my men and supplies, and by the middle of February, I expect to have the mail steamer *California*, running up there with lumber and supplies. Outside of this district one of my parties found

## A Silver Ore District

Between Lynn canal and Youiatate and Hoonah island. The ore they brought from there is most encouraging. They brought some chloride and some bromide silver ore which is quite high grade, and they claim to have plenty of it. They also bring samples of argentiferous galena, from a whole mountain of the kind, which yields 40% lead, and \$25 to \$60 per ton in silver.

Another ledge they report quite large, the samples yielding from \$30 to \$120 in silver and \$60 to \$100 in gold. They report also and bring fine samples of copper-silver glance, antimonial silver, and sulphurets of copper, in large quantities. This is called Morrisana district, and I shall visit it early in the spring in the U. S. N. steam launch. I must not forget to give due credit to Commander Glass and the other officers of the U. S. ship *Jamestown*, for their ready assistance to us prospectors, they having done everything in their power to further our efforts. You will please continue to send me the PRESS, and send me also a set of back numbers from July last.

Yours Respectfully, GEO. E. BILZ.

Sitka, Alaska, Jan. 25, 1881.

NEVADA.—Senator Jones naturally does not like the statement going the rounds of the press about the decadence of Nevada. He denies the assertions, and says: Nevada is in a prosperous



HOME AGAIN AFTER A WET DAY'S WORK.

condition. There is an impression in the East that our State government is so expensive that we think of abridging it and becoming a Territory again. This is not the case. Our people do not know that they have a government—that they have not felt it burdensome at all. Our system of taxation is such that the poor people do not feel the taxes. We are taxed according to our income. A mine is taxed for what it produces, so that it pays taxes on a part of its expenses, and comparatively speaking, the burden is not felt. In the East, taxes cannot be levied in that way, because there are too many rich men. In Nevada there are only a few rich men, and they cannot do much. Consequently, when a lode gives out like the Comstock, the revenue of the government falls off. Now, what, under such circumstances, does the Legislature do? It goes to work and cuts down salaries and expends right and left, to make the liabilities less than the receipts. We have no debt, and our miners are doing well, there being no State or Territory in the Union where mining is carried on so scientifically and systematically as it is in Nevada. The idea that we desired to be annexed to California, or return to a Territorial government, is absurd.

NEW GOLD MINES IN CHILE.—From a correspondent of the PRESS in Valparaiso, Chile, we learn that there is quite a gold fever in Leluanco, Indian district, over new discoveries. He says: "No one knows the truth yet over the fabulous stories told of the large tract of gold belt. It is to be hoped our people will not be fooled enough to come down here to suffer and meet disappointments. Better stay at home and let well enough alone."

THE HOMER MINING INDEX says: If miners in camps where the ore will admit of it, would go to work with their own arrastras instead of waiting for capital or for mills, we could have more prosperous camps and more well-fixed miners. This is something we have been urging upon miners for a long time. These miners who have started arrastras are better off than those who have waited to sell.

## Legislative.

It has become apparent that the Legislature will not have time to even consider half the bills before it. The dead-lock on the Debris Act Repeal question has hindered business greatly. The Legislature seems no nearer now to a solution of the problem than when it began its labors. Governor Perkins, however, asserts positively that he will not call an extra session. In an interview with Dr. May, on Wednesday, he said: "My decision is final. If no appropriation bill is passed, I shall run the State on credit for two years before I shall ever consent to call an extra session. And I can assure you," added his Excellency, "that this resolution cannot be shaken." The debris men will not consent to bring up the Murphy bill, and the anti-debris men will not permit any other bill to get ahead of it. Thus there is a dead-lock, which probably cannot be broken, as it will be absolutely impossible to get through the file in the short time remaining for work. About 1,000 bills are before the Legislature, and less than a dozen have been passed.

From a statement by Mr. Hutchings, guardian of Yosemite Valley, before a Legislative Committee, it seems that the revenue derived from the State by rents and leases is \$43,000 per year, of which half is paid out to the guardian. The valley was the only property owned by the State which yielded any revenue, and it could be made to pay far more than it did at present if new views were opened up, so as to make it more attractive. For the improvements mentioned, the Commissioners were of the opinion that an appropriation of \$24,000—\$12,000 this year, and \$12,000 next year—should be asked from the Legislature. It is to be hoped that the trails, now under private ownership, will be

side purchaser for value until the same is so entered upon the books of the corporation as to show the names of the parties by and to whom transferred, the number or designation of the shares, and the date of the transfer.

S. B. 209, to add a new section to the Penal Code, to be known as Section 307, to prevent the sale of liquors and tobacco to miners (by Mr. Bart), was passed.

A bill to prohibit the killing of domestic animals, or the sale or delivery of meat Sunday, was introduced in the Assembly by Howard of San Francisco.

Senator Hill introduced a concurrent resolution, asking our Senators and Representatives in Congress to use their influence to secure an appropriation of \$200,000 for the construction of a breakwater in Monterey harbor.

Paulk has introduced a Labor Bureau bill of similar import to that introduced by Enos. A committee of the Trade Unions of San Francisco is in Sacramento in the interests of the bill. A commissioner, who shall have charge of the bureau, is to be elected at the same time with legislative officers, and he is to have a salary of \$3,000 per year. His duties are to obtain accurate statistics of all the industries of the State, mechanical, mining, transportation, clerical and unskilled; the report on the amount of capital invested in lands, buildings, machinery, material and the means of production and distribution generally; the number, age, sex and condition of employees; on the apprenticeship system in skilled labor; average hours of labor; net wages; number and condition of the unemployed, with their age, sex and nationality, together with the cause of their idleness; the sanitary condition of lands, workshops, dwellings; cost of rent, fuel, clothing, water, in the various localities of the State; and finally as to the extent to which labor-saving machinery is employed, to the displacement of hand-labor. He is also to be empowered to ascertain the number and condition of the Chinese in this State; the same general facts in regard to their employment and mode of life as he is required to furnish relating to white laborers; to that extent their employment comes into competition with the whole industrial class of this State. Prison competition is to be inquired into also, and all the facts connected therewith reported. A deputy at \$1,800 per annum, office expenses and clerk hire are to be allowed the Commissioner.

Wm. Johnston has introduced an act authorizing the Capitol Commissioners to erect on Capitol grounds the Sutter Memorial and Industrial Exposition building.

Lampson has introduced a bill appropriating money for the purchase of trails within the Yosemite grant, and to improve the territory therein.

Paulk has introduced another drainage bill, to amend Sec. 20 of the debris law, and Platt one to amend Secs. 14, 20, 25 and 29 of the same law. Paulk's bill raises the miners' tax from half a cent to three cents on each miner's inch of water.

## The Miner's Cabin.

The little sketch on this page will remind many people, now residents of cities, of old days in the mines. And it will also be recognized as truthful by those who still "bach it" in mining regions of the coast. The storms of this winter must have brought to many a fire-side recollections of days when "roughing it" was experienced by the head of the family, and when he came into the cabin wet and weary to rest and dry himself by the blazing open fire.

And these things are not recollections only; they are still being experienced by the hardy miners of this coast. Hundreds of cabins dot the hill-sides, near the numerous mining camps, which are scattered through the mining regions. In all of these two, three, or four miners live on pretty much the same fashion that miners did 20 or 30 years ago. True, there are more hotels and boarding-houses, and more miners working for wages, and less for themselves, than there were in those "days of gold." Yet the miner's cabin of romance is still a reality as well. Perhaps there would be very little romance in the life if many of us were to return to it again after a lapse of years, wedded, as we are, to the artificialities of civilization; but we venture to assert that few look back to their days of rough living, hard fare, and hard work, with the pleasurable excitement provoked by the miner's vocation, without regret, and a wish that the same selfishness that prevailed among men then would exist now. A hard, wet day's work in a claim, in a rain-storm when water was plenty and the sluices full, instead of bringing ill humor and grumbling, brought joy and good humor, as is depicted on the faces of the bonest miners in our sketch.

MECHANICS' INSTITUTE.—In order that every requirement of the law might be complied with, a meeting of the members of the Mechanics' Institute was called, for the purpose of legally empowering the Trustees to sell or mortgage the property at present utilized as a library. The desired power was conferred by resolution, and the meeting adjourned without transacting other business.

W. N. LOCKINGTON has succeeded to the establishment at No. 520 Fifth street corner Bryant, where ore are tested, jewelers' sweeps worked, and assaying and amalgamating attended to.



**MINING AND FARMING LAND.**—It would save a great deal of annoyance to prospectors, as well as to other parties concerned, if those having, or pretending to have, mining ground, would record and work their mines. The law is plain upon this subject. This is a mining region, and we have mining regulations, which, if adhered to, will save a great deal of trouble. We have invited prospectors to come here and search for the hidden wealth, the development of which makes good times, and creates a market for the produce of our gardeners and ranchers. Take away the mineral right of the undeveloped mineral lands of this Divide, and our gardeners and ranchers will soon see such hard times as they never experienced before. And still we have men right in Georgetown, who would assist in "proving" the mineral off every acre of land which is not secured by a mining patent; men who, without the support derived from miners, would starve. Let the mineral character which the All-wise Creator has stamped upon this mineral belt, remain as the law of the land has rightly recognized it. Let no scheming corporation attempt to change the character of these lands by "law," and thus cause hundreds of miners to pay excessive tribute to them. The wants of agriculture do not demand these lands.—*El Dorado Gazette.*

The present financial condition of North Idaho is thus depicted by the Lewiston Teller: Our mines have produced less than their usual quantity of gold dust. A few thousand head of horses and cattle have been sold for cash at low figures. A few thousand pounds of wool and hides have been shipped. Our wheat shipments have been light. Of bacon and lard we have not raised enough for home supply, but have been compelled to ship from below. The average farmer is about finding out that the surplus product of his farm during the past year has been barely equal to his family expenses and the payment of hired labor.

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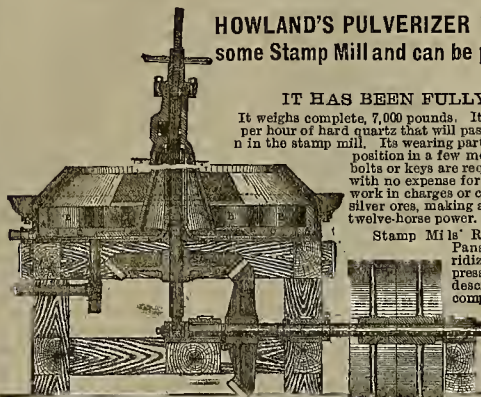
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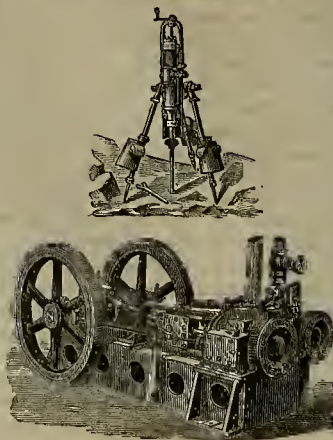
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Mines examined with a view of determining their value,  
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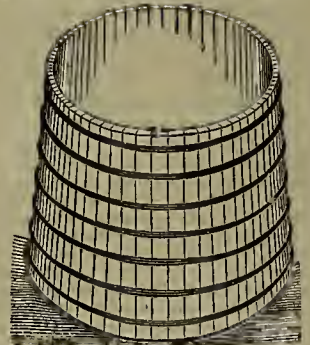
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## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, room No. 37, San Francisco, February 15th, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 64) of Fifty (50) Cents per share was declared, payable on Monday, February Twenty-first (21), 1881. Transfer books closed until the Twenty-second (22d) instant. J. W. PEW, Sec'y.

### ANNUAL MEETING.

The regular Annual Meeting of the Stockholders of the Paytona Gold and Silver Mining Company will be held at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California, on Monday, the Twenty-eighth (28) day of February, 1881, at the hour of 12 M., for the purpose of electing a Board of Directors to serve for the ensuing year, and for the transaction of such other business as may be presented. Transfer books will close on Friday, February Twenty-fifth (25), 1881, at the hour of 12 M. J. W. PEW, Sec'y.

Office—310 Pine Street, Room 15, San Francisco, Cal.

### DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company.

SAN FRANCISCO, FEBRUARY 10, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Thirty-Nine (39), of Fifty (50) Cents per share, was declared payable on Tuesday, February Fifteenth (15), 1881. Transfer books closed on Saturday, February Twelfth (12), 1881 at 3 o'clock P. M.

WM. WILLIS, Sec'y.

Office—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

### DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company.

San Francisco, February 1, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 14) of Twenty-five (25) Cents per share was declared, payable on Tuesday, February Fifteenth (15), 1881, at the office of the Company, Room 19, 328 Montgomery Street, San Francisco, Cal. Transfer books will be closed on February Tenth (10), 1881.

JOSEPH NASH, Sec'y.

### DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

San Francisco, February 2, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, dividend (No. 25) of Seventy-five (75) Cents per share was declared, payable on Saturday, February Twelfth (12), 1881, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York. WM. WILLIS, Sec'y.

Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

Booth Gold Mining Company.—Location of

principal place of business, San Francisco. Location of works, Auburn, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2) day of February, 1881, an assessment, No. Three (3), of Three (3) Cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room No. 44, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Seventh day of March, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the Twenty-eighth (28) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors.

GEO. R. SPINNEY, Sec'y.

Office—Room No. 44, No. 310 Pine Street, San Francisco, Cal.

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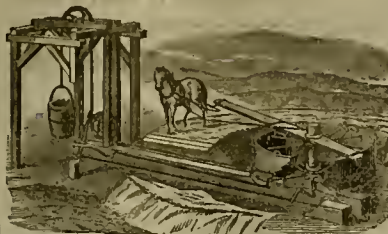
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The Most Economical Air Compressors in the Market.



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One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

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THE BALDWIN STEAM MOTOR for use on City and Suburban Roads.

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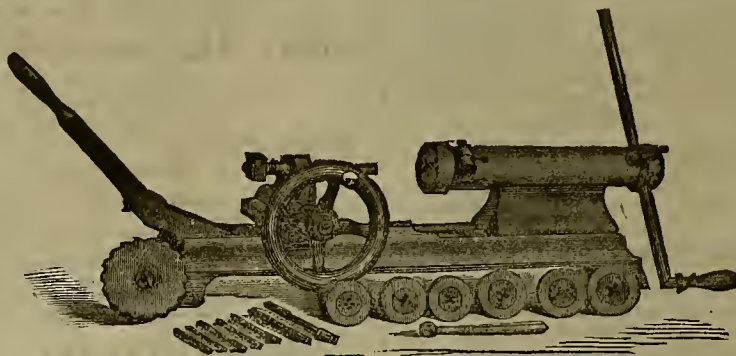
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WITH TAPS, DIES AND COLLETS COMPLETE.

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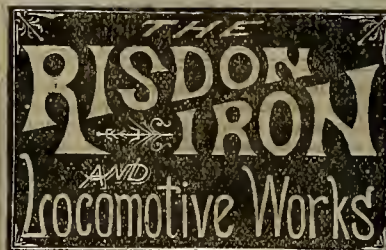
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Plunger Jigs. Revolving Screens.  
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Figs, Grapes, Peaches, Prunes, Almonds, English Walnuts, Oranges and other temperate and semi-tropical fruits can be raised with success on most of the tract without irrigation. Also, Alfalfa, Vegetables, Corn and all other cereals ordinarily grown in the state.

The soil throughout the tilled portions of the ranch proves to be of great depth and enduring in its good qualities. It is quite free from foul growths. The virgin soil among the large oak trees on the bottom land is easily broken up and cultivated.

The title is U. S. patent. Prices range principally from \$5 to \$30 per acre.

The California and Oregon railroad traverses nearly the entire length of the tract. There are several sections, stations and switches, besides depots at the towns of Anderson and Reading, all of which are located within the limits of the ranch.

The Sacramento River borders the whole tract on the southeast. Its clear waters are well stocked with fish. Good hunting abounds in the surrounding country.

Producers have a local market, which enhances the value of their produce. The railroad transportation route is level throughout to San Francisco. A portion of the land is auriferous and located near rich mines now being worked. Land suitable for settlers in colonies can be obtained on good terms.

Town lots are offered for sale in Reading, situated on the Sacramento river, at the present terminus of the railroad. It is the converging and distributing point for large, prosperous mining and agricultural districts in Northern California and Southern Oregon. Also, lots in the town of Anderson, situated more centrally on the ranch. Lots in both these towns are offered at a bargain, for the purpose of building up the towns and facilitating settlement of the ranch.

Purchasers are invited to come and see the lands before having here or elsewhere. Apply on the ranch, to the proprietor,

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Anderson, Shasta Co. Cal.

Location of Shasta County.

Shasta County lies not far from midway between the two most important ports on the Pacific shore, i. e., San Francisco and Portland Oregon, and directly on the overland route, which in the future will become the grand thoroughfare from Mexico to British Columbia. The town of Redding, at present, and probably for years to come, the head of railroad transportation on the California side of the mountains intervening below Oregon, is distant from San Francisco by railroad (via Valjejo) 255 miles; from Sacramento City, 160 miles; from Marysville 117 miles.

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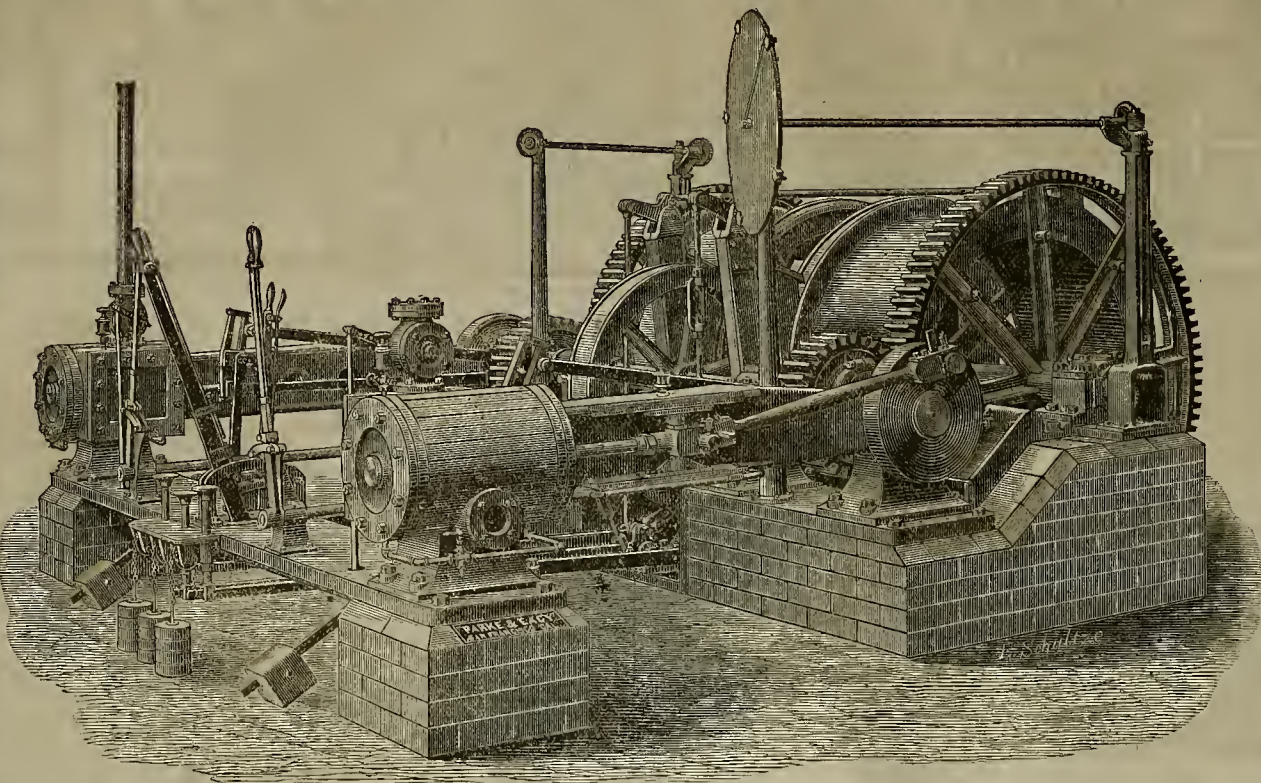
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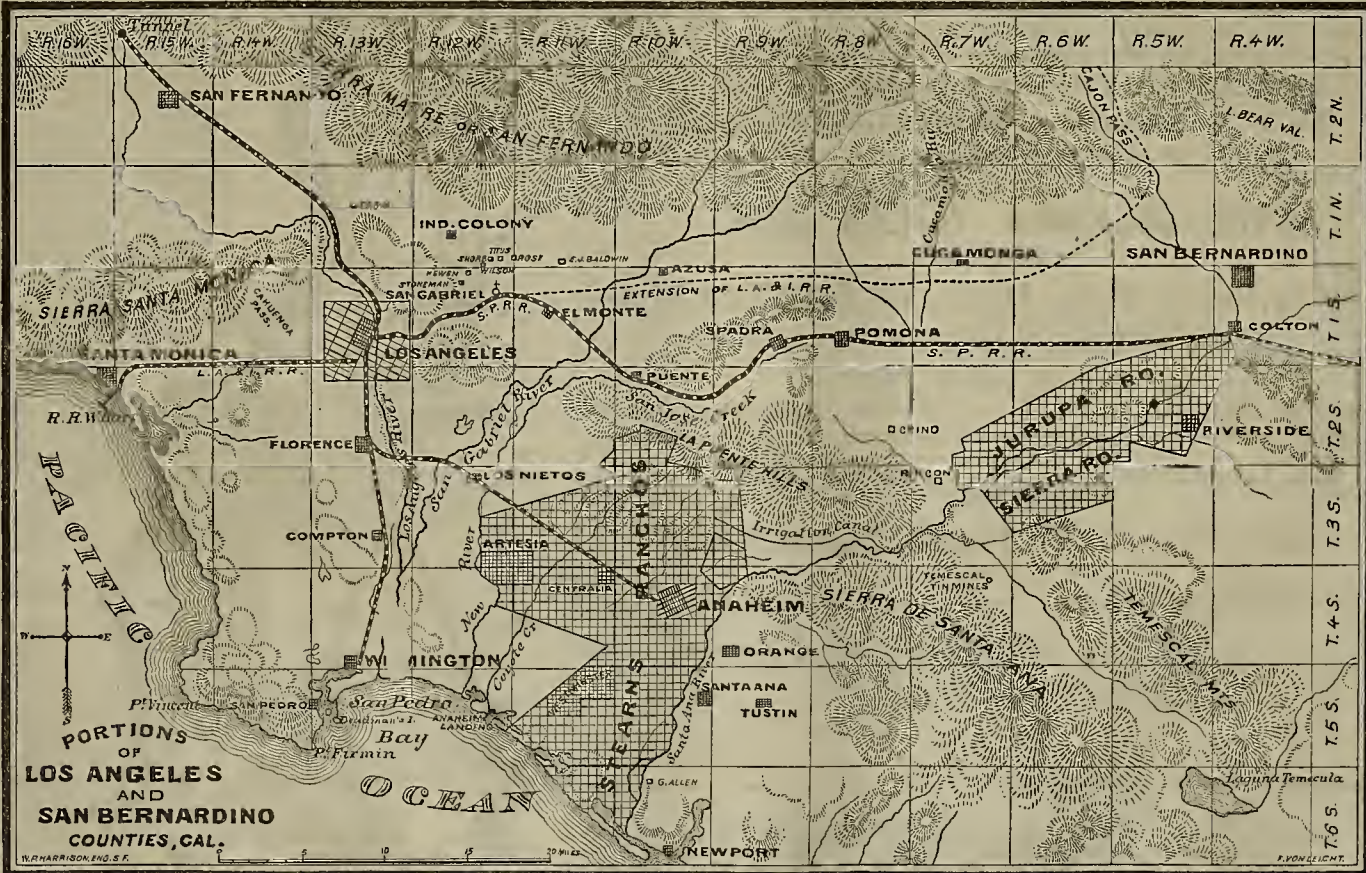
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, FEBRUARY 26, 1881.

VOLUME XLII  
Number 9.

## Roasting Ores for Leaching Process.

Mr. Ottokar Hoffman, a gentleman who has had a great deal of experience and success in leaching operations, and who was engaged by the Silver King mining company of Arizona to put up their leaching works, has planned and carried out at that mine an important improvement in the details of a revolving cylinder furnace, which we show in the drawing given herewith. Mr. Guido Kustel has kindly furnished us with the following description of it:

The usual cylinder furnaces, roasting by charge, are from 15 to 16 ft. long. The flame enters the furnace on one side and escapes through the flue on the other. The ore near the fire side is much more exposed to the heat than at the other end, and the chlorination here is always further advanced than it is in the ore on the flue side. At the Gunnison mill, Nev., I had two cylinder furnaces for roasting a very delicate ore. When it was well chloridized on one side, it was not done on the other, and if the roasting continued so much longer as to effect a uniform chlorination, the ore near the fire side commenced to form small balls, which, increasing by constant rolling, assumed the size of five to eight inches in diameter. Mr. Hoffman found in ordinary cylinders the ore from the fire side from six to ten per cent. less chloridized than the ore from the fire side. For this reason he ordered a cylinder provided with fire-places on both sides of it.

The furnace is 16 ft. long by 6½ ft. in diameter; inside lined with common brick, except the fire-places for which fire-bricks were used. As seen in the drawing there is on each side of furnace a fire-place, B and C, each having an iron flue provided with dampers, A and D. Both flues are connected with the main flue. At the time of charging both dampers are open. Three tons are charged at a time; the furnace has a larger capacity, but, owing to the considerable increase of the ore in volume during the roasting, only a little over three tons are introduced.

When all the ore is in, one of the flues is shut by the damper A, and on the same side the fire started. The flame passes now through the furnace, which revolves once in four minutes, through the opposite fire-place into the flue. After one hour fire is made on the other side, the damper D is closed and A opened, and the flame takes the reverse course. The change of fire from one side to the other takes place every hour. It requires three hours before the roasting of the whole mass is in operation. After 11½ hours the chlorination is completed and ore discharged. It takes half an hour to charge and discharge, so that two charges are discharged in 24 hours.

In starting the furnace, Mr. Hoffman found a considerable loss of silver. He immediately arranged the admission of steam from both sides of the furnace. The steam is let in as soon as the sulphur commences to burn, and the effect was most gratifying, reducing the loss to the minimum, which did not exceed from two to three per cent.

There is a great advantage achieved with the adoption of two fire-places. The roasting is now under perfect control. The chlorination is quite uniform, because of the uniform heat that can be maintained through the whole length of the furnace; at the same time, if necessary, the ore can be roasted at a lower heat than it was possible to do if only one fire were in use, which is of great consequence, as with many kinds of ores a low heat gives a larger percentage of chlorination. Having both flues open, very little dust can escape during the charging, there being no draught through the

furnace, then, being able to keep a lower heat, less ore (or none at all) will stick to the brick lining.

The Silver King ore, from October to the end of December, 1880, as an average of regular daily samples, assayed \$208.26 per ton, and from the 1st of January 1881, \$220.60 (not concentrated). The average value of the tailings, beginning with January, is \$9.94. This shows an extraction of 95.5%, a result of which Mr. Hoffman has all reason to be proud, considering the composition of the ore, which contains native silver, copper-glance, zinc blend in abundance, galena, copper pyrites, peacock ore and fahlore, the latter and galena carrying a great deal of antimony. Mr. Hoffman says that the fahlore (argentiferous gray copper ore) is the most important part of the Silver King ore, it being always present and always rich, even up to \$3,000 per ton; the gangue is quartz and heavy spar.

Zinc blend and antimony are always very troublesome and a great obstacle in roasting silver ore, and the favorable result obtained is due principally to Hoffman's double fire-places and application of steam. After a permanent run of three months and a half, not the slightest

## Lead.

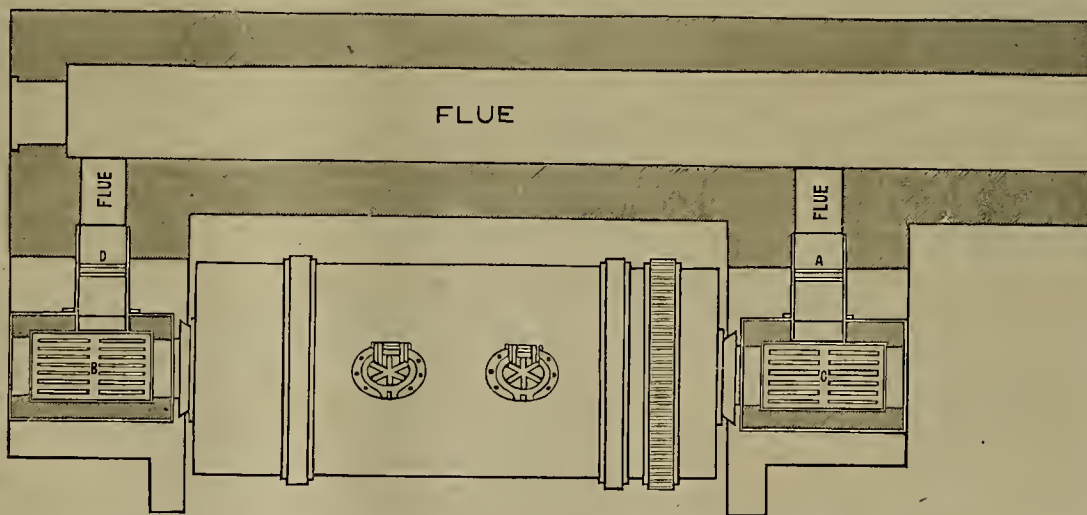
California for several years had a very large export trade in lead, to China but this trade has fallen off very greatly. One year we exported some 5,000 tons. Last year the exports were very small, the Chinese having gone elsewhere for their supplies of this metal. The reasons for this may possibly be found to be those stated by Mr. G. Ross, chairman of the Frongoch (English) Lead Mining Company, at the annual meeting of that company in London a week or two since. He said: "When I was in the chair last year I ventured upon one or two predictions, and, although I am not a prophet, they came pretty right. The statistics of the lead trade for the year 1880 compare very favorably with the statistics for the previous year. The imports of lead for the year were something like 6,980 tons less than in 1879. That is a good feature. The exports have also assumed a more favorable character. Some time back I ventured to say that the Chinese, who were buying their lead largely in California, would, sooner or later come here, and that little forecast is

## A Metallurgical Center.

We have hitherto advocated the establishment of metallurgical centers on this coast, where ore of all classes would be worked, but it seems hopeless to advocate such things when a city with the natural advantages of San Francisco, with relation to the mining regions of the coast, takes no interest in it. During the many years when San Francisco was the ruler of the mining regions of the coast, she could have built up for herself a system of reduction works, which would bring now to her door the trade of the Western mining regions which she sees scattered in other cities. The capitalists of San Francisco, however, have seen more profit in lending money than in building up home industries of this kind.

We can get ores of every sort on this coast, and by combining them judiciously, the poor ore could be made to pay. It takes capital, however, to establish and maintain such works, but they are profitable in the end. All those cities which have gone into this sort of business have made money out of it. The great metallurgical center of the world is Swansea; and notwithstanding its immense business of the past few years, its trade shows a rapid and steady increase. San Francisco, on a smaller scale, could have had a position of the same sort of business, had it taken the opportunity, and it is not too late to begin now even.

The official statistical returns of the trade connected with the port of Swansea for the year 1880, just published by the Harbor Trustees, prove that trade has been good, there being substantial increases in every department. The exports of coal have been larger than ever before known—patent fuel also shows a very large increase—the trade being nearly double what it was two years ago. The exports of iron and steel also show substantial increases. The increase in the imports has been principally in iron ore, pig iron and copper ore. The total imports and exports show an increase of on



IMPROVED ROASTING FURNACE WITH DOUBLE FIRE PLACES.

est repairs were required for the furnace. Two more of similar style have been built by the Pacific Iron Works, and will be in working order in 10 or 15 days.

**COPPER.**—Quotations for copper in Liverpool on the 1st inst., for good ordinary brands, were: £62 to £62 5s. on the spot, and for forward delivery £63 to £63 5s. per ton. Ore, 12s. 6d. to 12s. 7d.; and regulus 12s. 9d. per unit. Chile has varied very slightly in value during the month. Furnace material was in considerable request, notwithstanding the strike of the colliers. Stocks show a reduction of 2,455 tons for the month. The Chile figures show a falling off of 10,000 tons compared with last year, and of 5,000 tons compared with the year before. James Lewis & Sons' Ore and Metal report circular gives these figures in detail.

**MAITLAND DISTRICT.**—The new district of Maitland, Nevada, comprises the greater part of the old Walker Lake district, and is bounded as follows: On the north by the old camel trail, beginning at Silver Star district, and running to the southeast end of Walker Lake; on the west by the line of the Carson and Colorado railroad and the Alum Creek wagon road; on the south by the Carson and Columbine toll road, and on the east by the Black Diamond district. The district lies principally on the north side of the range of mountains north and west of what is known as the Marietta range. The minerals of the district are copper, silver and gold, with the former in preponderance.

gradually becoming true, for the exports to China last year were 4,000 more tons than in the previous year, and of this amount something like 1,650 tons were experienced in the latter part of the year, which shows that the trade with China is growing and returning to its old channel. This is a very important point, because the Chinese were eight years ago our largest and best customers, but the Americans undersold us. The Chinese took the lead without much regard to the quality, and found it would not roll. Then, the exports from Greece have fallen off to almost nothing. It looks as if the population took to lead producing very much as some of our people take to stone breaking—only when they are compelled. All these little facts lead us to conclude, and hope, that the coming year will bring us a better price for lead. Within the last two or three days there has been a decided improvement in the zinc trade. The Germans are giving from 25s. to £2. a ton more for zinc, and it is upon the possibility of an improvement in this direction that we depend for a good price for lead. Therefore, without leading you to expect any very brilliant or gorgeous things, I think there are sufficient facts to lead us to infer that our prosperity will be no less than it has been in the past."

**SALT.**—The Sand Springs salt marsh, in Churchill county, Nevada, has been having a lively run the past few months, furnishing salt for the Grantsville mines to the amount of 200 tons per month. The property was for a long time considered valueless, and some years ago was sold for taxes to the present owner, who is now reaping a rich bonanza.

less than 352,404 tons over the trade of 1879; entering a little more into detail, the total quantity of coal and coke exported last year was 999,283 tons, as against 880,214 tons in 1879; patent fuel, 209,771 tons, as against 162,167 tons in 1879; copper, silver, zinc and other ores, 25,120 tons, as against 27,681 tons in 1879; iron, steel, rails, castings, etc., 14,542 tons, as against 8,691 tons in 1879; tinplates, 25,343 tons, as against 26,438 tons in 1879. Other miscellaneous articles were exported, the total exports for the year being 1,333,093 tons, as against 1,158,711 for the year 1879. The imports were, copper, silver, lead, tin and nickel, with their ores and alloys, 140,576 tons in 1880, as compared with 125,591 tons in 1879; iron ore, 122,284 tons, as against only 19,603 tons in 1879; iron, steel, castings, machinery, 94,234 tons, as against 87,437 tons in 1879; which, with the sundries, brought up the total imports for the past year to 648,799 tons, as against 470,777 tons in the year 1879. The total trade of the port (import and export) for the past year was 1,981,892 tons, as against 1,629,488 tons in 1879. The total income of the harbor for the past year was £68,860 16s. 7d., and the total expenditure £58,208 12s. 9d. (which included no less than £28,966 3s. 9d. interest on the bonded debt), leaving a surplus balance of £10,651 3s. 10d. in favor of the trust on the year's working. There is now an accumulated surplus in the hands of the trust of no less than £20,486 7s. 6d., after payment of interests and all expenditure.

The high water washed upon to Jack Power's mining claim, Butte Co., over \$2,000 worth of wood.



Montana Mines.

The hullion shipments from Butte for the week ending yesterday, aggregate \$74,256.20, the largest yet reported in that length of time. This fact is a flattering commentary upon the increasing productiveness of the Butte mines, and is an eloquent appeal for the general recognition of the resources of the district. For a camp which has all the advantages of capital, machinery and railroad communication, the production in one week of \$74,000 is not extraordinary; but when that amount is produced in a district isolated from the continental thoroughfares, remote from the Eastern and Western centers of business, and possessing none of the advantages afforded by the introduction of outside capital, the event becomes of sufficient importance to challenge the attention of intending investors. The regularity and amount of the hullion shipments from the camp are forcing themselves upon the notice of moneyed men, both East and West. A few of the many prominent mines which may be safely depended upon to add to the wealth and fame of the district for years to come, may be enumerated as follows:

Alice, producing daily 60 tons of ore assaying from \$40 to \$80.

Lexington, producing 15 tons per day, assaying from \$60 to \$150 from one level 80 ft. deep, showing a pay ore body 950 ft. long.

Bell, producing 10 tons of silver-copper ore assaying from \$250 to \$500, together with a high percentage of copper, and having reserves of first and second-class ore sufficient to keep a 30-ton smelter in successful operation for upwards of two years. The Bell is constantly improving with depth, and surprises even its owners by its width, richness, regularity and indications of permanence.

Auselmo, with \$50,000 worth of ore on the dump, to which additions are being made at the rate of 10 tons per diem. The most sanguine expectations of the owners of this property are being realized, and it could not be bought today for \$250,000.

The Colusa, a copper mine, producing 40 tons of ore daily, with immense reserves in sight.

The Gagnon, one of the steadiest producers of good ore in the Territory.

The Acquisition, showing in the present working six ft. of \$150-ore.

To this list may be added the Grey Rock, Stevens, Hope, Salishury, Star West, Original, Burnett, Belle of Butte, Pacific, Ophir, Anacanda and Sunnyside, which are all exceptionally fine properties, on a good paying basis, and showing an abundance of workable ore.—Butte Miner, Feb. 10th.

Silver Hill District, Arizona.

From Mr. William Gale the Journal has obtained some very interesting notes of the progress of work in the Silver Hill district, about 40 miles west of Tucson. The mine of John William Murphy, F. B. Knox, of Globe, Tommy Gates and Dave Gibson is showing up splendidly. Some of the capping was broken off, and they got right into a cave of metal almost indefinite in dimensions. The formation is a black limestone, very similar to that in Tombstone, and assaye of carbonate ore average \$169 to the ton.

About seven miles from this camp is the town of Peltonville, where the great copper deposits have been found. Mr. Scott, from Charleston, has recently purchased the old Boot mine from Fish and Shaw. He went over to Tombstone the other day, and brought to the town 20 miners, who are now working steadily to develop the property. The ore is oxide of copper and carbonates, which runs like water.

Mr. Ray, one of the owners of the copper mines in Bisbee, has some fine property near Peltonville, and has struck it rich in one of his claims. He took a number of gentlemen out yesterday to inspect his property.

William Zeckendorf has opened a store at Peltonville. There is every reason to believe the camp will shortly rival our best mining centers.

The Monarch mine and extensions of the Abbie Waterman, owned by Patty Woods, Dr. W. Wheatley, P. O. Shaw and others, in close proximity to the mine of John Wm. Murphy mentioned above, is attracting much attention and showing up finely.—Arizona Mining Journal.

COPPER MINING IN NEVADA COUNTY.—The receipts of the San Francisco copper mining company, whose claim is located at Spenceville, for the eight months ending Dec. 31, 1880, were \$71,993, including \$25,000 from assessment No. 6, levied Sept. 15, 1880. The expenditures were \$76,617. On the 1st of January, 1881, the liabilities of the company amounted to \$5,076, against which there were assets valued at \$68,792, consisting of ore, copper, and supplies. There was 6,980 tons of ore manipulated in the last eight months of 1880, and 334,000 lbs. of copper cement produced. The cave has been opened sufficiently to get out 100 tons of ore daily, at a cost of 50 cents per ton.

THE Committee on Mines in the Arizona Legislature have reported in favor of the repeal of the bullion tax, and the report will probably be adopted.

LARGE quantities of water-pipe are being shipped to the State Line mine, Gold Mountain.

Railroad Fares in California.

Action of the Railroad Commissioners. The Board of Railroad Commissioners held a meeting in this city on Friday, Feb. 18th, Commissioners Cone, Beerstecher and Stoneman being present. The pending resolution to establish a schedule of tariff rates for transportation of passengers on railroads in this State was taken up for consideration, and, after being

TABLE SHOWING PRESENT AND PROPOSED RATES.

FROM.	TO.	Miles.	Present Rate (in cents).	Rate per Mile (in cents).	Rate by Board (in cents).	Difference (in cents).	Per Mile (in cents).
San Jose.	San Francisco.	48	\$1.75	3 1/2	\$1.70	5	3 1/4
San Jose.	Caradero.	32	1.50	4 5/8	1.30	20	4 1/8
Caradero.	Tres Pinos.	18	1.25	7	70	55	3 3/4
Caradero.	Castroville.	27	1.00	3 2/3	1.00	3 1/2	3 1/4
Castroville.	Monterey.	16	75	4 1/2	65	10	3 3/4
Castroville.	Soledad.	33	2.75	8 1/3	1.30	1.45	4 1/4
San Francisco.	San Rafael.	14	50	3 1/2	25	25	3 1/4
San Rafael.	Petaluma.	21 1/2	1.00	4 1/2	85	15	3 3/4
Petaluma.	Fulton.	19	1.30	6 5/8	75	55	3 5/8
Fulton.	Guerneville.	10	1.15	7 1/2	65	50	3 1/2
Fulton.	Cloverdale.	20	2.00	6 5/8	1.20	80	3 1/4
San Francisco.	Donahue.	34	75	2 1/5	75	2 1/5	2 1/5
Donahue.	Fulton.	27	1.80	6 1/2	1.10	70	3 1/4
San Francisco.	Vallejo.	29	1.00	3 1/2	1.00	3 1/2	3 1/4
Vallejo.	Napa Junction.	9	75	8 1/2	35	40	3 1/4
Napa Junction.	Calistoga.	94	1.50	4 1/2	1.35	15	3 1/4
Napa Junction.	Fairfield.	13	1.00	7 1/2	55	45	3 1/4
Fairfield.	Port Costa.	1	1.25	9	50	75	3 1/4
Fairfield.	Elmira.	10	75	7 1/2	40	35	3 1/4
Elmira.	Madison.	30	1.50	5	20	30	3 1/4
Elmira.	Davis.	16	1.00	6 1/2	55	45	3 1/4
Davis.	Woodland.	0	50	5 1/2	35	15	3 1/4
Woodland.	Willows.	05	4.65	7 1/2	2.60	2.05	3 1/4
Woodland.	Knight's Landing.	13	75	6 1/2	35	40	3 1/4
Davis.	Santa Ana.	13	75	6 1/2	45	30	3 1/4
Sacramento.	Roseville Junction.	18	1.00	6	65	35	3 1/4
Roseville Junction.	Marysville.	34	2.00	6	1.35	65	2 1/4
Marysville.	Redding.	152	7.75	5 1/2	6.10	1.65	1 1/2
Roseville.	Truckee.	102	0.10	9	4.10	5.00	5
Sacramento.	Shingle Springs.	48	4.00	8 1/2	1.90	2.10	4 1/4
Alameda.	Santa Cruz.	75	3.40	4 1/2	3.00	40	1 1/4
Los Angeles.	Los Angeles.	240	22.00	8 1/2	12.25	9.75	3 1/4
Los Angeles.	Los Angeles.	34	2.00	7 1/2	1.40	60	3 1/4
Los Angeles.	Wilmington.	22	50	2 1/2	50	2 1/2	2 1/2
Los Angeles.	Santa Monica.	18	50	2 1/2	50	2 1/2	2 1/2
Los Angeles.	Goshen.	242	10.75	7 1/2	0.70	7.05	3 1/4
Goshen.	Huron.	40	2.50	7	1.60	1.20	3 1/4
Goshen.	Lathrop.	140	10.20	7	5.85	4.35	3 1/4
Lathrop.	Stockton.	9	50	5 1/2	80	20	2 1/4
Stockton.	Peters.	15	1.00	6 1/2	60	40	2 1/4
Peters.	Milton.	15	1.00	6 1/2	60	40	2 1/4
Stockton.	Oakdale.	19	1.25	6 1/2	75	50	2 1/4
Galt.	Galt.	21	1.00	5	75	25	1 1/4
Galt.	Ione.	27	2.25	8 1/2	1.10	1.15	4 1/4
Lathrop.	Sacramento.	27	1.25	5 1/2	05	30	2 1/4
Tracy.	Tracy.	11	65	5 1/2	40	25	2 1/4
Port Costa.	Port Costa.	40	1.50	3 1/2	1.40	10	2 1/4
Vallejo Junction.	Vallejo Junction.	3	15	5	15	5	1
Oakland or San Francisco.	Oakland or San Francisco.	55	1.90	4 1/2	1.35	55	3 1/4
Niles.	Niles.	25	90	3 1/2	90	3 1/2	3 1/4
Niles.	San Jose.	18	75	4 1/2	65	10	1

amended, was adopted by the Board in form as follows, all the Commissioners voting aye:

Preamble and Order.

WHEREAS, The Constitution of the State of California makes it obligatory on the Board of Railroad Commissioners to establish rates of charges for the transportation of freights and passengers by all railroads and other transportation companies in the State, and publish the same from time to time with such changes as they may make; therefore, ordered

First—That the rates for the transportation of first-class passengers between the following named points shall be as follows:

COMPANY.	FROM.	TO.	Length of Section.	Rate per mile.	Tariff over each section established by the Board.
S. P. R. R.	Yuma.	Los Angeles	249 1/2	\$12.25	
L. A. & S. D. R. R.	Los Angeles	Santa Ana	34 1/2	1.40	
S. P. R. R.	Los Angeles	Wilmington	22 1/2	50	
L. A. & G. R. R.	Los Angeles	Goshen	242 1/2	9.70	
S. P. R. R.	Goshen	Huron	40 1/2	1.60	
C. P. R. R.	Goshen	Lathrop	140 1/2	5.85	
C. P. R. R.	Lathrop	Stockton	9 1/2	60	
S. & C. R. R.	Stockton	Peters	15 1/2	60	
S. & C. R. R.	Peters	Milton	15 1/2	60	
S. & C. R. R.	Peters	Oakdale	19 1/2	75	
C. P. R. R.	Stockton	Galt	21 1/2	75	
C. P. R. R.	Galt	Ione	27 1/2	1.10	
C. P. R. R.	Galt	Sac'to	27 1/2	95	
C. P. R. R.	Lathrop	Tracy	11 1/2	40	
C. P. R. R.	Tracy	Port Costa	40 1/2	1.40	
C. P. R. R.	Port Costa	Val. Jct'n	3 1/2	15	
C. P. R. R.	Val. Jct'n	Od & S. F.	23 1/2	76	
C. P. R. R.	Tracy	Niles	53 1/2	1.85	
C. P. R. R.	Niles	Od or S. F.	25 1/2	90	
C. P. R. R.	Niles	San Jose	18 1/2	65	
S. P. R. R.	N. D.	San Jose	48 1/2	1.70	
S. P. R. R.	N. D.	San Jose	48 1/2	1.30	
S. P. R. R.	N. D.	Car'dro.	124	70	
S. P. R. R.	N. D.	Castroville	27 1/2	1.00	
S. P. R. R.	Castroville	Soledad	33 1/2	1.30	
N. P. C. R. R.	S. F.	San Rafael.	14 1/2	25	
S. F. & N. P. R. R.	S. F.	Petaluma	21 1/2	85	
S. F. & N. P. R. R.	Petaluma	Fulton	19 1/2	75	
S. F. & N. P. R. R.	Fulton	Guer'ville	10 1/2	65	
S. F. & N. P. R. R.	Fulton	Cloverdale	20 1/2	1.20	
S. F. & N. P. R. R.	Fulton	Donahue	34 1/2	75	
S. F. & N. P. R. R.	Fulton	Vallejo	29 1/2	1.10	
C. P. R. R.	S. F.	Vallejo	28 1/2	1.00	
C. P. R. R.	N. R.	Napa J.	9 1/2	35	
C. P. R. R.	N. R.	Calistoga	34 1/2	1.35	
C. P. R. R.	N. R.	Napa J.	13 1/2	55	
C. P. R. R.	N. R.	Fairfield	13 1/2	50	
C. P. R. R.	N. R.	Port Costa	14 1/2	40	
C. P. R. R.	N. R.	Elmira	10 1/2	40	
V. V. & C. L. R. R.	Elmira	Madison	30 1/2	1.20	
N. R. R.	Davis	Woodland	16 1/2	55	
N. R. R.	Woodland	Willows	6 1/2	2.60	
N. R. R.	Woodland	K. Land.	9 1/2	35	
C. P. R. R.	Davis	Sac'to	13 1/2	45	
C. P. R. R.	Sac'to	Roseville	18 1/2	65	
C. P. R. R.	Roseville	Marysville	34 1/2	1.35	
C. P. R. R.	Roseville	Redding	152 1/2	6.10	
C. P. R. R.	Roseville	Truckee	102 1/2	4.10	
S. & P. R. R.	Sac'to	Shingle S.	48 1/2	1.00	
S. & P. R. R.	Alameda	S. Cruz.	75 1/2	3.00	

Ferry Rates.

The rates now in force on the several railroads for transportation of passengers between San Francisco and the various stations in Oakland, Alameda, Brooklyn and Berkeley are adopted by the Board as its rates.

Uniformity of Rates.

Second—That the rates per mile for first-class passengers over each of the above designated distances or sections, shall be uniform for all

passed at the 23d session of the Legislature of the State of California, styled "An Act to organize and define the powers of the Board of Railroad Commissioners," approved April 15, 1880, and why such resolutions and tariff rates should not go into force and effect on the 20th day after service, pursuant to the provisions of chapter LIX aforesaid, which resolution was adopted by all the Commissioners voting aye.

Rates of Freight.

Commissioner Cone offered the following resolution:

WHEREAS, The Board of Railroad Commissioners have this day, by an unanimous vote, fixed upon rates for the transportation of passengers over the railroads of this State, and have ordered notices to be served upon the several railroads affected, notifying such companies to appear before the Board within 15 days after service of such notices, and show cause, if any there be, why such rates should not go into effect according to law, therefore

Resolved, That the Board now take up the subject of freight rates, and fix and establish the same upon all railroads in this State.

The resolution was passed by an unanimous vote.

Pacific Coast Steamship Company's Case.

The minutes of the previous meeting were then read and approved.

The Secretary then read the following report:

"On Feb. 15, 1881, I was instructed by the Board to communicate with Messrs. D. L. Smoot, Clitus Barboar, Belcher & Belcher, Chipman & Garter, respectively, solicitors and counsellors at law for the Board in the suit of the Pacific Coast Steamship Company vs. the Board of Railroad Commissioners, which I did, on the same day, sending a letter, in form, as follows, to each of the gentlemen mentioned; viz., 'I am instructed by the Board of Railroad Commissioners to request your answers to the following questions, viz.:

'First—What is the status of the suit of the Pacific Coast Steamship Company vs. the Board of Railroad Commissioners?

'Second—How soon will there be a hearing in the matter?

'I am requested farther to state that the Board is very desirous to have the matter brought to judgment as soon as possible.

'Your reply by return mail is requested. Very respectfully, W. R. ANDRUS, Secretary.'

I have to date but one reply in answer from D. L. Smoot, Esq., as follows:

February 16th, 1881.

W. R. Andrus, Esq., Secretary Railroad Commissioners.—DEAR SIR: In reply to yours of the 15th inst., just received, I have the honor to state that the status of the suit, the Pacific Coast Steamship Company vs. the Board of Railroad Commissioners, is as follows:

Complaint, answer and reapplication filed on Dec. 30, 1880, and cause set for hearing on April 6, 1881. I exceedingly regret that it will not come up earlier. If there be any very cogent reasons for earlier hearing, and you will advise me of it, I will see what can be done in that behalf. Very respectfully, D. L. SMOOT.

Dist. attorney city and county of San Francisco.

Respectfully submitted, W. R. ANDRUS, Secretary.

The Board then adjourned to meet at the same place on Saturday, at 10 o'clock A. M.

The accompanying table prepared by the Secretary of the Commission, exhibits actual changes in rates and amounts by a comparison of present and proposed rates.

Silver Reef Items.

A correspondent of the Pioche Record says: It is impossible at this writing to give any definite idea as to the course which in future will be pursued by members of the Stormont Co. towards the miners. One thing in this struggle can be relied upon—that is, the miners will not submit to a reduction of wages. The Stormont's property consists of the Buckeye, Last Chance, Thompson and McNally mining claims, the two latter being situated on the White Reef. There has been thousands of tons of ore extracted from the last named claims, and they show no weakening. About 2,000 ft. to the south of the Thompson and McNally is the McMullen, which is owned by John H. Rice. This is a valuable property, but is not being worked.

The Leeds, if managed properly, would be a paying institution, but a practical superintendent has never had charge. The present superintendent is now in a position where he hardly knows what to do, because his company will neither lead nor drive; consequently the mine—a good one—is of no account to shareholders thereof.

The Christy Co. looks fine, and judging from the amount of hullion which that company shipped last year through Wells, Fargo & Co.'s express, the present year's yield will be far in advance; because the milling facilities of the company have been increased, and are still being enlarged.

The Barbee & Walker Co.'s property is in a flourishing condition. The third level is looking well; the ore vein will average 14 ft. in width, and extends to the north a distance of 300 ft. So that the mine here, as far as I can see, go to the deep.

DULL times in Mammoth district. Mammoth mill is idle. Only few men at work in Monte Cristo tunnel and few more in the Mammoth. Lots of snow and no communication.



## MECHANICAL PROGRESS.

## Malleable Cast Iron.

M. Faarqneque recently read a paper before the French Academy of Sciences on malleable cast iron, in which, as condensed by the *Iron Age*, he states that, as a hard softener, one observes throughout the mass an abundant deposit of amorphous graphite. Matters stand thus when the bar lies in an inert mass, as in anthracite coal; but when the pig iron comes in contact with an substance capable of burning or absorbing the carbon, a secondary reaction sets in. The liberated carbon having disappeared from the superficial zone, the equilibrium determined by the heat undergoes a slight change. A portion of the graphite from the lower strata returns to its combination, and ascending to the surface disappears, and is replaced in its turn by another. The phenomenon continues until the average composition of the bar corresponds to a certain minimum of carburization of the iron, varied according to the circumstances of the annealing process. In inert surroundings the proportion of carbon which remains combined, has evidently the maximum of carburization for its limit, or, in other words, the maximum of the solubility of the carbon at the temperature at which the operation takes place.

The working out of these results recalls in a general sense the principle which underlies cementation, but in reality it is more complicated, inasmuch as it results from the superposition of two distinct chemical actions. A proportion of manganese, even below 5-1000's, gradually arrests the softening process until it ceases altogether. The pig, of course, continues to lose carbon by oxidation, almost as much, in fact, as when it is pure, but the manganese resists the production of graphite and retains it in combination in the metallic mass. The silicon may, to a certain extent, saturate the manganese and drive out the graphite. He finds these explanations based on the following facts, as elicited in the course of his experiments: 1. Pig iron, which is truly malleable, always contains graphite; 2. Pig may lose carbon, and yet remain brittle if graphite be not formed, or if the quantity existing before the annealing process be not augmented; 3. Pig may become malleable without losing a sensible portion of its total carbon, the annealing being effected by the medium of coal, the co-operation of an oxidizing agent not being indispensable to the softening process; 4. If silicon be added to a manganese pig the metal is improved by annealing. His tests on steel have confirmed these conclusions. He was surprised to find that hydrogen toward 900° rapidly decarbonized forge pig. Malleable pig stands midway between steel and gray pig, being distinguished from the latter by special nature of its amorphous graphite and its greater tenacity, and from the former by its feeble extensions and its large proportion of graphite.

**CHANGES IN THE EARTH'S ORBIT.**—Sir Chas. Lyell gives the results of Mr. Stone's calculation of the variations which have taken place in the figure and position of the earth's orbit during 1,000,000 years. These results show the inaccuracy of the statement often made in popular works on astronomy, that the eccentricity of the orbit varies between definite limits, with a definite period of oscillation, the position of the perihelion traveling, meanwhile, continually in one direction. On the contrary, the successive maxima of eccentricity differ considerably, and so of the successive minima. The period of oscillation is variable; and the perihelion not only travels with variable velocity, but sometimes retrogrades for 20 or 30 years together. In the whole range of years tabulated by Mr. Stone, the greatest eccentricity is .0747. This was the case 850,000 years ago, and the earth's orbit was then nearly as eccentric as Mars' present orbit. The least eccentricity within the period tabulated, occurred 900,000 years ago; at this time the eccentricity was .0102. The present eccentricity is .0168.

**RADIANT MATTER.**—Hittorf considers that the results of Crooke's researches upon radiant matter are not essentially different from those which he himself published in 1869. The only novelty which he recognizes consists in Crooke's admission of a fourth state of aggregation. He does not regard this admission as necessary, and he is unwilling to admit that the dark space near the negative electrode represents the mean length of molecular path. He attributes the radiant matter to particles mechanically torn from the electrodes, which are charged with static negative electricity. These particles move in a straight line, with enormous velocity and affect, by a molecular electric convection, the whole track of the current between the two poles.—*Les Mondes*.

**IMPROVED CONSTRUCTION OF BUILDINGS.**—Mr. William H. Older, of Packwaukee, Wis., has patented an improved construction of building designed especially for use upon prairie and other parts of the country where timber is scarce. A peculiarly constructed frame of timber and wire, the timbers being secured by bolts, is the principal feature of the invention. The outside may be covered with straw thatch, tarred paper, etc. A serviceable building can thus be constructed with little timber and at a small cost.

## Steel.

From an article read before the Engineers' Society of Western Pennsylvania, we extract the following points about the use of steel:

1. That a good soft heat is safe to use if steel be immediately and thoroughly worked, for it is a fact that good steel will endure more pounding than any iron.

2. If steel be left long in the fire it will lose its steely nature and grain, and partake of the nature of cast iron. Steel should never be kept hot any longer than is necessary to the work to be done.

3. Steel is entirely mercurial under the action of heat, and there must, of necessity, be an injurious internal strain created whenever two or more parts of the same piece are subjected to different temperatures.

4. It follows that when steel has been subjected to heat not absolutely uniform over the whole mass careful annealing should be resorted to.

5. As the change of volume due to a degree of heat increases directly and rapidly with the quantity of carbon present, therefore, high steel is more liable to dangerous internal strains than low steel, and great care should be exercised in the use of high steel.

6. Hot steel should always be put in a perfectly dry place of even temperature while cooling. A wet place in the floor might be sufficient to cause a serious injury.

7. Never let any one fool you with the statement that his steel possesses peculiar property, which enables it to be "restored" after being "burned;" no more should you waste any money on nostrums for restoring burned steel. For "overheated" steel can be restored by first bringing it to a red heat and allowing it to cool slowly. For "burned" steel, which is oxidized steel, there is only one way of restoration, and that is through the knobbing fire or the blast furnace.

8. Be careful not to overdo the annealing process; if carried too far it does great harm, and is one of the commonest modes of destruction which the steel-maker meets in his daily troubles. It is hard to induce the average worker in steel to believe that very little annealing is necessary, and that very little is really more efficacious than a great deal.

Finally, it is obvious that as steel is governed by certain and invariable laws in all of the changes mentioned, which laws are not yet as clearly defined as they should be, nor as they will; nevertheless, the fact that there are such should give us confidence in the use of the material, because we may be sure of reaching reliable results by the proper observance of the laws; therefore, there is no good reason why engineers should be afraid to use steel if they manipulate it intelligently.

**AN ELECTRIC HAMMER.**—The Siemens "electric furnace" of last winter has now been supplemented by an electric hammer, the invention of Messrs. Siemens and Halske, Berlin. The device consists of three hollow coils of insulated wire having a movable core or rod of soft iron, which is free to move up and down under the axial attraction of the coils when a current circulates in them. The central coil is traversed by a constant current which magnetizes the rod or hammer, and the two extreme coils are traversed by alternating current from a dynamo-electric machine in such a manner that they alternately attract and repel the magnetic rod up and down so as to make it beat like a hammer. The range of blow is limited on one side by a spiral spring placed within an elastic cushion. Of course a very great rapidity of action can be given to the hammer, while the arrangement is apparently applicable to working a rock drill.

**TO HARDEN STEEL.**—A very fine preparation for making steel very hard is composed of wheat flour, salt and water, using, say, two teaspoonfuls of water, one-half a teaspoonful of flour, and one of salt; heat the steel to be hardened enough to coat it with the paste—by immersing it in the composition—after which heat it to a cherry red and plunge it in cold, soft water. If properly done, the steel will come out with a beautiful white surface. It is said that Stuhls' files are hardened in this manner.

**NEW FRICTION PULLEY.**—A. T. Arnold, Fitchburg, has recently patented a friction pulley, which is a combination with the loose pulley, segmental friction shoe, and a split ring encircling the base of the pulley. Levers are used, which throw the segmental shoes in contact with the inner surface of the pulley face, and forces the split ring into engagement with the hub. This is a peculiar combination, and we should judge it would be very effective.

**PROTECTING IRON FROM OXIDATION.**—Mr. A. Reid, London, places the iron to be operated upon in a properly constructed furnace, and completely covers its surface with soot, or other matters composed of the same elements and having similar properties; the temperature is then raised to a red or white heat, and continued for 15 or 30 minutes, or longer, according to the mass of iron to be operated upon; it is then removed from the furnace and allowed to cool; the surface is then thoroughly cleaned, and is found covered with a coating which is impervious to rust under ordinary circumstances.

## SCIENTIFIC PROGRESS.

## Stones Clinging to Under Side of Ice.

G. M. Philips, of Lewisham, Penn., communicates to the *Scientific American* his ideas in regard to the not uncommonly observed phenomena of stones found clinging to the under side of ice. This is often seen where the water is several ft. deep; but never, we believe, in still water, and usually in very rapid running streams of from two to four ft. deep. This phenomena was displayed the past winter upon a very large scale in the Susquehanna river, near which Mr. Philips resides. Mr. P. writes: "More than 200 years ago Dr. Plot, of Oxford, Eng., described similar occurrences in the Thames, and gave at least a partial account of their true cause. It is well known that water, like most other substances, contracts under the influence of cold until it is reduced to a temperature of 39°. But if its temperature is lowered still further it expands until reaching 32°, when it freezes, by which its bulk is increased much more than by its cooling from 39° to 32°. Hence it is that water begins to freeze at the surface, since, when near the freezing point, the coldest water, being the lightest, is found upon the top, and it is that which freezes first.

But when the weather is very cold, and the different parts of the stream are thoroughly mixed by rapids or some such mechanical action, the water may be about the same temperature at all depths, and he lowered altogether nearly to the freezing point. In this case the water will begin to freeze at the bottom, because it is still there, and perhaps because the stones and bottom have lost some heat by free radiation and by contact cool the water. Although so much lighter than the water this ice would not rise as soon as formed, for it would be frozen fast to the bottom and the stones lying upon the bottom. But as soon as its size gave the cake of ice buoyant power enough it would tear itself loose from the bottom and the larger stones and rise to the surface, carrying with it the smaller stones and gravel. Then it would be frozen in with the surface ice, keeping its curious load frozen fast to its under surface.

In November the weather became suddenly very cold, the thermometer sank to 3°, and the river here was frozen over in one night, a very unusual occurrence. Moreover, the places where the phenomenon occurred was just below the dam, where the current was swift and the river rather shallow. All of these would tend to mix up thoroughly the whole mass of the water. These circumstances seem to show the above to be the true explanation.

In the Thames, stones weighing as much as eight pounds have been known to be raised up from the bottom of the river in this way. Under favorable conditions, and acting through a long time, the ice, by carrying these materials down stream, must cause geological effects which are not inconsiderable."

**FUGITIVE SPECTRA.**—NEW SOLAR PHENOMENA. Trouvelot, in the observations at his physical observatory in Cambridge, during the past four years has examined the sun with a spectroscopic daily, whenever the weather would admit. On the 30th of August, 1877, at 2:30 P. M., he noticed for the first time a singular phenomenon. He was minutely exploring the solar circumference when suddenly, upon a group of brilliant protuberances, the solar spectrum was invaded with the rapidity of lightning and traversed by very brilliant linear spectra, which succeeded each other with great rapidity and ran through the whole visible length of the principal spectrum. He has subsequently turned his attention specially to these phenomena, and finds that they are of comparatively frequent occurrence. Their presence may be explained by two hypotheses. The first attributes them to meteors and the consequent disturbances which are supposed to give rise to the corona; the second looks to solar forces which are brought into play by unknown causes, producing profound disturbances accompanied by eruptions of incandescent materials, either solid or liquid, which are thrown in all directions to great heights in the solar atmosphere. Trouvelot inclines to the latter view, but he is continuing his observations in the hope of finding positive evidence to show whether the bodies which produce the spectra fall into the sun, or are ejected from it.—*Ann. de Chim. et de Phys.*

**INFLUENCE OF DUST AND SMOKE ON FOG AND RAIN.**—Mr. John Aitken recently read a paper before the Royal Society of Edinburgh on the origin of fogs, mists, and clouds. From a great number of experiments with moist air at different temperatures, to determine the conditions which produce condensation of water vapor, he concludes that whenever water vapor condenses in the atmosphere, it always does so on some solid nucleus; that dust particles in the air form the nuclei on which the vapor condenses; that if there were no dust there would be no fogs, no clouds, no mists, and probably no rain; and that without the beneficial influence of dust and smoke, which latter consists mostly of solid particles of carbon, the supersaturated air would convert every object on the surface of the earth into a condenser on which it would deposit as dew; lastly, that our breath, when it becomes visible on a frosty morning, and every puff of steam, as it escapes into the air from an engine, show the impure and dusty state of the atmosphere.

## Singular Discovery in Connection with Phosphorescence.

The property possessed by certain metallic sulphides and other phosphorescent bodies of absorbing light when exposed to its influence, and giving out the same when brought into a darkened room, has long been known to scientists, but it is only quite lately that efforts have been made to utilize such properties. Of these, the most striking consisted in spreading a sulphide of this nature upon a flat tablet and exposing it to a strong light for a few seconds under an ordinary photographic negative. Upon removing the tablet thus impressed into a dark room, the picture on it will be found to be glowing in quite a mysterious and wonderful manner, and it will continue for some minutes to radiate the light which it absorbed.

It has occurred to an ingenious physicist, A. L. Henderson, to mix one of the most sensitive of these phosphorescent metallic sulphides with the bromide of silver, now so generally employed in the preparation of photographic dry plates, and, after emulsifying this mixture with gelatine, spreading it upon the surface of glass plates, and treating the same as ordinary ones, except in so far as regards the exposure, which must be momentary. He appears to have reasoned in this way: With even the briefest exposure capable of being given, a certain modicum of change will be produced on the sensitive bromide of silver, although manifestly such as will be incapable of yielding a properly developed image. But the light also falls upon the atoms of the phosphorescent powder incorporated in the film; and as these in turn radiate such light, it follows that they will complete the imperfect exposure set up in the bromide by the direct action of the light.

This reasoning has been found correct, and the result at present stands that plates have been prepared having such exceeding sensitiveness as to be well impressed by what Mr. Henderson designates "the flash of a match."

Phosphorescent sulphides may easily be prepared by heating the carbonate of lime, of barites, of strontia, or other carbonate found most suitable, in a covered crucible with half its weight of sulphur. After an hour's exposure to heat, the preparation is complete and phosphori are obtained which, upon being briefly exposed to light and then withdrawn into a dark room, will be seen to glow brightly, the color of the light emitted depending upon the nature of the carbonate originally selected.

This application of a well recognized fact in phosphorescence is so novel, and calculated to be of so much use, that we have no doubt its progress toward development will be rapid.—*Scientific American*.

**EFFECT OF OIL ON EVAPORATION.**—E. Frankland, of the British Royal Society, says: "It has been frequently noticed that during fogs near large towns the air is not saturated with moisture, the dew point in one instance being as much as 10° C. below the temperature of the air. Seeing the possible connection between this phenomenon and the fact that the evaporation of water is greatly retarded by its surface being covered with a film of oil, the author made a series of experiments on the comparative rates of evaporation of water when freely exposed to a current of air and when covered with a film of oil or of coal tar or of coal smoke. It was found that the film retarded the evaporation from 92.7% to 66.6%. The results of these experiments point out a condition of very common occurrence, competent to produce "dry fog," while they also explain the frequency, persistency and irritating character of the fogs which afflict our large towns.

**PROF. BELL'S MUSICAL DISKS.**—Some French physicists contend that the musical notes produced by Prof. Bell in disks of mica, India rubber, metal, and wood, by holding them in the path of a rapidly interrupted beam of light, are really due to heat and not to light. M. Mercadier has obtained like sounds from ordinary gas lamps, without employing lenses to concentrate the interrupted beam, by simply bringing the receiving disk near the source of light. Even a plate of copper heated to bright red produced very distinct musical notes, which died gradually away as the plate cooled to a dull red. Disks coated with silver on the side exposed to the ray gave very feeble sounds, but when coated with lampblack the sounds were strong.

**SEPARATION OF COBALT AND NICKEL.**—Reibol gives the following new method for the qualitative separation of these two troublesome metals, especially when there is but little cobalt in the presence of a larger quantity of nickel. Both metals are precipitated with potassium hydrate solution and filtered. The unweighed precipitate is thrown into a test tube and heated with very strong potash until it boils. Under these circumstances the cobalt dissolves with a blue color, thus proving its presence in a very simple manner.

**A NEW COLORING MATTER.**—If carbon disulphide is agitated with semi-fluid sodium amalgam, and if the paste-like mass is mixed with water, there is produced a hyacinth red liquid, while mercury and mercury sulphide are deposited. The solution contains the sodium salt of a yet unknown acid, somewhat soluble in hot water, and more readily in alcohol. It dyes yellow, orange and brown shades on wool and silk.



## MINING SUMMARY.

CALIFORNIA

### ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'NT.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Alta M Co	Nevada	19	50	Jan 6	Feb 10	Mar 2	W H Watson	302 Montgomery st
Belcher S M Co	Nevada	26	50	Feb 15	Mch 19	Apr 9	J Crockett	327 Pine st
Cal Imperial M Co	Cal	7	15	Jan 10	Feb 15	Mar 1	W R Hild	309 Montgomery st
East Noonday M Co	Nevada	14	10	Jan 13	Feb 18	Mar 11	W E Dean	309 Montgomery st
Gould & Curry M Co	California	1	10	Feb 18	Mch 18	Apr 16	C V Hubbard	310 Pine st
Hargrington M Co	Nevada	39	50	Feb 3	Mch 8	Mch 23	A K Durbrow	309 Montgomery st
Heads Center M Co	California	2	05	Dec 28	Feb 3	Mar 2	O C Miller	324 Pine st
Lead M Co	Arizona	12	30	Dec 31	Jan 31	Feb 26	W B Smith	310 Pine st
Lead M Co	Utah	4	15	Feb 2	Mch 14	Apr 11	D B Chisholm	327 Pine st
New York M Co	Nevada	25	10	Feb 1	Mch 5	Mch 26	D L Thomas	327 Pine st
Occidental Con G M Co	California	6	04	Feb 21	Apr 11	May 12	W T Smith	402 Montgomery st
Uro M Co	California	7	30	Feb 21	Mch 14	Apr 6	W Sinar	308 Sansone st
Wes Center M Co	Nevada	18	10	Feb 15	Mch 15	Feb 15	H L Edwards	410 Montgomery st
Spaulding M Co	California	1	10	Dec 17	Feb 15	Mch 15	J Hein	117 Battery st
Swamp Angel M Co	Nevada	2	07	Jan 10	Feb 16	Mar 8	C W Badger	320 Sansone st
Sierra Nevada M Co	Nevada	67	1 03	Jan 7	Feb 10	Feb 28	E L Parker	309 Montgomery st
Tellurium M Co	California	24	10	Dec 3	Jan 5	Feb 23	J M Litchfield	425 Montgomery st
Union M Co	California	1	10	Dec 1	Jan 1	Feb 1	W H Field	309 Montgomery st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

Alad Mountain Extension M	Cal	1	03	Jan	13	Feb	16	Mär	10	J W Orear	Downville
Belvidere M Co	California	10	25	Feb	18	Mch	24	Apr	16	C V Hubbard	310 Pine st
Brooklyn Con M Co	California	1	05	Feb	21	Mch	23	Apr	13	J T McGeehan	318 Pine st
Carbora M Co	Mexico	3	10	Feb	16	Mch	16	Apr	2	T P Holmes	309 Montgomery st
Commonwealth Con M Co	Cal	4	10	N o v	12	Feb	14	Mar	5	Chas A Morse	217 Sansone st
Continental Tunneling M Co	California	1	10	Dec	27	Feb	27	Mar	27	D Maser	408 California st
Equitable Tunnel M Co	Utah	25	15	Dec	31	Feb	8	Mar	5	C J Collins	227 Montgomery st
Goshdshaw M Co	California	8	15	Feb	18	Mch	24	Apr	13	A F Main	319 California st
Haeleo M & M Co	California	7	40	Feb	18	Mch	23	Apr	20	W Van Eekelen	California st
Headlight M Co	California	4	10	Jan	11	Feb	14	Mar	7	A W Rose	302 Montgomery st
Hewitt M Co	California	1	30	Feb	28	Mar	2	Apr	5	E J Hays	330 Pine st
Hove M Co	Nevada	2	10	Jan	31	Mar	12	Apr	4	A Adler	76 California Market
Iowa M Co	Nevada	12	05	Jan	17	Feb	21	Mar	16	O C Leavitt	41 1/2 California st
Marion White M Co	Nevada	8	25	Dec	17	Jan	26	Feb	23	J J Scoville	309 Montgomery st
May Flower G M Co	California	10	10	Jan	18	Feb	21	Mar	18	J Morison	378 Montgomery st
McClintock M Co	Arizona	3	20	Jan	12	Feb	24	Mar	18	J Morison	328 Montgomery st
McClintock M Co	California	8	05	Feb	3	Mch	10	Mch	30	W H Lent	309 Montgomery st
Northern King M Co	Arizona	5	15	Jan	21	Feb	23	Mar	21	R A Holmes	318 Pine st
New York M Co	Nevada	25	10	Feb	1	Mar	5	Mar	26	D L Thomas	326 Pine st
Real Deal Monte M Co	Nevada	14	20	Jan	31	Mar	28	Mar	28	W H Leonard	310 Pine st
Rocky Point M Co	California	6	05	Jan	21	Feb	23	Mar	14	W Hughes	330 Pine st
Syndicate M Co	California	3	25	Feb	15	Mch	23	Apr	12	J Stadfield	419 California st
South Hite M Co	California	1	25	Feb	15	Mch	21	Apr	15	F A Berlin	515 California st
San Pedro M Co	California	3	03	Feb	21	Mch	23	Apr	16	W G Holmes	3 Sansone st
Stacy M Co	Nevada	2	10	Feb	2	Feb	28	Mar	2	G C O'Neil	309 Montgomery st
Vanderbilt M Co	Nevada	2	10	Feb	5	Mch	14	Apr	4	J Morizio	328 Montgomery st
Wide Awake M Co	Arizona	12	10	Feb	17	Mch	25	Apr	6	C Hildebrandt	232 Sutter st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Concordia M Co	California	W J Taylor	310 Pine st	Annual	Mich 7
Equitable Tunnel M Co	Utah	C J Collins	512 Montgomery st	Annual	Mich 27
El Tesoro M Co	Arizona	H H Chickering	214 Sansome st	Annual	Mich 29
Golden Chariot M Co	Idaho	J T McGeoghegan	318 Pine st	Annual	Mich 7
Hale & Norcross M Co	Nevada	F J Lightner	309 Montgomery st	Annual	Mich 9
Potosi M Co	Nevada	W K Keane	309 Montgomery st	Annual	Mich 9
Meridian M Co	Nevada	H W Allen	306 Pine st	Annual	Mich 7
Swansea M Co	California	J G Klumpke	230 Sansome st	Annual	Feb 15

**LATEST DIVIDENDS—WITHIN THREE MONTHS**

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50	Feb 22
Father De Smet M Co	Dakota	H Deane	New York	50	Mar 1
Indian Queen M Co	—	Grove Adams	Merchants' Ex	10	Oct 2
Napa Con Quicksilver M Co	California	W W Parrish	330 Pine st	10	Oct 30
Northern Belle M & M Co	Cal	Wiu Willis	309 Montgomery st	50	Feb 14
Silver King M Co	Arizona	J Nash	California	25	Feb 14
Standard Con M Co (2)	California	Wm Willis	309 Montgomery st	75	Feb 14
Western M Co	California	C S Curtis	309 Montgomery st	75	Feb 14

## The Mining Share Market.

Although there was some little activity in Alta and one or two other stocks for a time, on Thursday, the market dropped back to what it is now, its normal condition—stagnation.

The Hale & Norcross folks are again at work on their lower levels as usual. Work will be resumed in the south drift on the 2400 level of the Potosi as soon as the rock extracted can be hoisted at the Combination shaft.

Connection will be made between the Yellow Jacket and Sutro tunnel within five weeks, when new life will be given to all mines of the group, as Crown Point, Belcher and Imperial. All these mines will at once be drained, when they shall have to raise the water no higher than the Sutro tunnel level.

The Bullion folks are exploring ground in which something is liable to be found. The ground is all fertile.

The Alta folks are doing good work in the way of sinking their main shaft, and it is passing through a lively and favorable formation.

Six years ago, during this month of 28 days, the yield of the Consolidated Virginia mine was \$3,682,000. The average of ore hoisted was 633 tons per day or 17,714 tons in all. This is the largest monthly output of any silver mine yet discovered, and no mine could be expected to last under such rapid exhaustion.

John W. Mackay, of the bonanza firm, is on his way hack from Europe, and it is said that he carries the control of the Sutro tunnel in his pocket.

### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports :

Mt. Potosi, Feb. 17th, \$9,600; Northern Belle, 14th, \$8,082.42; Northern Belle, 19th, \$10,300; Christie, 22d, \$9,700; Germania, 16th, \$2,280; Orleans, 10th, \$1,283; Horn Silver, 16th, \$5,000; Germania, 18th, \$4,500; Horn Silver, 18th, \$12,500; Ontario, 18th, \$7,494; Mintie, 18th, \$3,278; Ontario, 19th, \$4,780; Horn Silver, 19th, \$10,000; Germania, 19th, \$3,660.

A LETTER from the Wood river country, Idaho, says in many places are to be seen the rifle pits and holes sunk in the bedrock by the first parties who passed through the country looking for Placer mines and fighting Indians. There were large parties from Boise Basin and Rocky Bar, who scouted through the country as early as 1844-5. In one place three skeletons were found in a rifle pit.

THE mining belt in Idaho is over 200 miles in width, and extends through Montana into the British possessions.

PACIFIC COAST APPROPRIATIONS.—The Sun-

dry Civil Appropriation bill, as prepared by the House Committee on Appropriations, and now awaiting passage by the House, contains the following distinctively Pacific coast appropriations: For continuation of the stone drydock at Mare Island Navy Yard, \$200,000; for Benicia Arsenal, to build machines, armorer's shop and store building, carpenters' and blacksmiths shops, \$50,000; for continuing artesian wells and for pipe and turbine wheel, \$5,000; for one timber-shed, \$2,500; for wharf repairs, \$2,000; for building freight house, \$1,000; for surveying private land claims in California, \$10,000; for surveying private land claims in Arizona and New Mexico, \$8,000 each; for contingent expenses of the Surveyor-General's office in California, \$4,000; for the same in other Pacific Coast States and Territories, \$1,500 each; for surveying public lands throughout the whole country, \$200,000, to be apportioned by the Interior Department; for the geological survey under Clarence King, \$15,000; for the coast survey of the Western Division, \$18,000; for the construction and maintenance of military telegraphs on the Indian and Mexican frontiers and in the Northwest, \$75,000; for the repair and preservation of government buildings in Alaska, \$8,000; for salaries and expenses of Treasury agents at the Alaska seal fisheries, \$7,770; for completing the erection of a first-class lighthouse and steam fog signal on the rock off Tillamook Heads, Oregon, \$25,000, to be immediately available.

THE *Post's* Washington special says: The Chinese Treaties hang fire in the Senate, and the failure of that body to act is creating some discussion as to its reasons therefor. One reason stated is that the treaties will affect the relations of the next Administration with the Chinese, and that it is only fair to leave its hands untied, and more time for consideration, in view of the facts that important restrictive legislation is proposed. Again, it is urged that the "most-favored-nation-clause" in the treaty yields to the Chinese the right to be naturalized, in opposition to the wishes and legislative enactments of the Pacific coast. Also, it is said that the treaty will not effectually stem the tide of immigration, as a large part—two-thirds it is said—of the Chinese immigrants are those who are returning after one term of residence here, and as such are not excluded. The provisions of the Commercial Treaty, governing the proceedings of mixed Courts, and the carrying of opium, are also meeting with some criticism.

McGARRAHAN.--The House Committee on private Land Claims have recommended the passage of the bill to confirm to Wm. McGarrahan all that tract of land in the State of California known as "Rancho Panoche Grande," save such portions as have been patented or settled upon with the intention, in good faith, of obtaining title under the laws of the United States. For these portions scrip for other Government lands is to be issued.

### Sales at S. F. Stock Exchange.

Wednesday A.M., Feb. 24.		100 Utah		2.71	
10	Alpha	21	20	Yellow Jacket	2.55
580	Alta	2	62	Yellow Jacket	2.55
290	Andes	1.30	31.33	400	Albion
45	B & Belmont	.90	50	300	Argentina
45	B & Belmont	.90	50	300	Argentina
130	Bellison	1	95c	25	Bodie
100	Benton	.65	245	Bechtel	.40
130	California	.95	50	Butwiler	.75
120	Con Argenta	.60	150	Columbus	.60
30	Con Imperial	.75	100	Concordia	.24
30	Confidence	.24	140	Day	.31
25	Chollar	.70	400	Standard	.20
100	Chollar	.25	150	Eureka	.22
20	Challenge	.75	150	Eureka	.22
200	Concordia (Va.)	2.20	90	Goodshaw	.60
220	Exchequer	1.05	475	Grand Prize	1.15
30	Hale & Nor.	2.85	300	Juniper	.30
30	Hale & Nor.	2.85	225	Mt Diablo	.40
350	Julia	.30	25c	125	Mono
100	Lady Wash.	.15	125	Mono	1.70
30	Mexican	.45	100	McClinton	.10
80	New York	.40	20	Mahabon	.40
100	Ophir	4.80	70	Mt Diablo	1.40
150	Overman	.60	225	Noonday	2.20
100	Occidental	1	10	N Noonday	.10
100	Occidental	.60	10	N Noonday	.10
306	Savage	1.95	60	300	Pais
295	Sierra Nevada	.6	30	300	Pais
100	Silver Hill	.90	50	Silver King	.20
200	Silver Hill	.90	300	Syndicate	.20
25	Union	.05	300	Syndicate	.20

FOUR years ago Butte was a played-out mining camp. To-day it is the principal city in Montana. During the past year 200 houses have been constructed within the city limits.

UNDER the laws of New Mexico, mining claims must be recorded with the county recorder, whether there is a district recorder or not.

## AMADOR.

**TELLURIDE.**—*Amador Ledger*, Feb. 19: This mine, situated between Pine Grove and Volcano, is showing considerable activity. Two thousand ft of 11½-inch pipe is being placed in position to run the mill. The water is being brought from the Volcano ditch, which will insure a pressure of 200 ft. If this is found to be insufficient, an additional pressure of 95 ft can be secured by carrying pipe to the upper ditch. It is only intended to run stamps to start with, but there is room for 16 stamps more, should the development of the mine warrant the addition. There is plenty of rock in the mine, the only question to be decided is whether it is of paying grade.

**MISCELLANEOUS.**—Two hydraulic streams are playing upon the Grass Valley gravel claim, near Volcano. The auriferous bank is 15 ft in thickness, and is being washed away at a slow rate. The Amador Gold and Silver Co. has purchased the Monticlarich mine. There is a rumor afloat that the mine is to be started soon, but it cannot be verified at present. The shaft is said to be in a very disjunct condition.

**RICH MINE.**—*Dispatch*, Feb. 19: Messrs. F. Mace and John Ham are now taking out some extraordinarily rich rock from their mine near Mace's mill, a short distance above Volcano. They have on the dump about 100 tons which is said will yield at least \$60 per ton. It is not known how extensive the ore body is, but it has every appearance of being a permanent ledge of good width.

The big tunnel at Volcano has been pushed through but owing to some little "miscue" either on the part of the survivors or workmen, considerable work will yet be required before flumes can be put down for the mining operation.

**THE MONTEICHIARD.**—It is reported that the Monticchiard mine has been sold to a New York company and that the new owners are getting ready to start the mine up again in a short time.

**HENRY & RANDALL** have commenced operations on their gravel claim, near Aqueduct, on quite an extensive scale, and, we understand, with very flattering prospects.

**THE TELLURIUM.**—We understand that a new 5-stam mill is being put up at the Tellurium mine, near Pine Grove, and that the rock now being taken out is of excellent quality.

NOTES.—Croville Mercury, Feb. 18: P. R. Wells brought into this city last week a specimen of very rich ribbon quartz taken from a mine near Bangor. Thursday the Miocene company commenced work repairing the head end of their ditch, which was washed out by the late

head-dam of their drien, which was washed out by the flood. The telephone line of the Micoeno Co. is completed as far down as Thompson flat, and by Saturday wires will be in the main office. The ditches and flumes of the Frost & Reece mine were not damaged in the leak by the storm. There is now 2 ft of snow over the whole property. The water in the Banner mine has at last been pumped out, and on Monday evening the men were able to get down on the 300 level for the first time in 10 days. The Micoeno Co. have made arrangements whereby they are to have the use of about 800 inches of water from the Hendricks ditch. The water will be put into the claim

and work commenced at once. The Foultz amalgamate on the Miwewa mine, will be running by the last of the week. Mr. McSmith informs us that he has one engine to run the machine for 3 months, at the rate of 25 tons per day. That it will not be necessary to run a single level, only stop out what is in front of him. At a meeting of Oro M. Co., held in this city Saturday, the following officers were elected: J. M. Brock, President; L. D. Free Searcy; J. J. Smith, Supt.; J. J. Smith, R. Parker, D. R. Perkins and E. W. Slater, Board of Directors. The stock of this mine is steadily advancing. Mr. Perkins sold a few hundred shares for an advance of 60%.

**CALAVERAS.**—Rich Placer Claim.—*Calaveras Chronicle*, Feb. 19: W. are informed that a man by the name of Rivers, who thought what is known as Doak's ranch, situated about 8 or 10 miles southeast of this place, struck some very rich ground on the ranch. The ground, though not extensively reported to be exceedingly rich.

**PROSPECTING.**—A company of 8 Italians have commenced work on a quartz ledge, on the Whiskey Slide road, in the canyon extending from the divide at Buckeye to the Galena. The ledge is being run into the hill for the purpose of prospecting the lead. The tunnel is already over 80 ft.

**DITCH REPAIRED.**—The heavy breaks in the Mokolumuan and Campo Seco Water Company's ditch, occasioned by the recent heavy storm, have been repaired, and the ditch is again running its full head of water. The break caused a cessation of mining operations in the hydraulic claims for a few days.

**EUREKA HYDRAULIC.**—Work still continues with unabated energy in the Eureka claim, on the Calaveras river. With the exception of a day or two during the last heavy rainstorm, which occasioned some breaks in the ditch, no time has been lost. For 24 hours a day and 7 days a week, 2 pipes are kept in action, running 700 or 800 inches of water. Everything is progressing finely, and the owners, Messrs Cook Bros., are anticipating better returns than the claim has ever yet yielded.

**EL DORADO.**  
SPANISH DRY DIGGINGS.—*Georgetown Gazette*, Feb. 10.  
Our camp is by no means dead; on the contrary mining  
being vigorously prosecuted with good results in general.

There are a number of prospectors here hard at work, and from their conversation I should say that they are all satisfied with the outlook. The Walker mine is being worked by the same party as usual. Jake Burner and partners are plying on the Grit mine, and feel confident of a fine clean-up. Russ Davis recently picked up on his claim a quartz body of about 40 lbs weight, beautifully spangled and filled with gold. The Buckman Bros. are sluicing on the Georgia flat claim, and lately picked up some fine specimens out that ground. Louis Sites is sluicing to uncover seams on his Modoc ground, and has some good seams to his sight. Messrs. Slinger, Davis and Barr are sluicing on the Gravel claim, and clean-up in their surface diggings. Our Spanish residents are all busy, and show a goodly amount of dust as the result. Messrs. Simpser & Hines are very busy with a force of men clearing away a land slide near the head of their ditch. There is a prospect of capitalists taking hold of some of our good old mines, such as the Slinger, Davis and Barr, which have really only been scratched on the surface, yet have paid so largely. There is big pay in those claims awaiting some lucky investors.

**INYO.**—For *Saline*—*Inyo Independent*, Feb. 10: Jerry McCarty's prospecting in the new Saline district has resulted already in attracting the attention of such well known mining operators as Dwight Crittenden, of the Mammoth and Jeff McClellan, formerly prominent on the Comstock. These gentlemen, under guidance of Mr. McCarty, passed through Fish Lake Creek and Big Pine last Wednesday, and from there across the Inyos to Saline valley. They have some of the most important locations under bond, and seem so confident of being satisfied with them after examination that they have already ordered an ample supply of mining material to vigorously prosecute work.

**MARIPOSA.**  
**MERCED HYDRAULIC Co.**—*Mariposa Gazette*, Feb. 16.  
 We learn from reliable sources that the prospects of this company at this time are really better than first anticipated. In the new cut which has been run, the back channel or old bed of the river has been struck, which from appearances and pay prospects of the extensive haul of gravel, the company has a bonanza that will be a per-



ment thing for years to come. Since the commencement of the rainy season more gravel has been washed altogether than of last year. The fact of finding the river bed or channel is a "dip" of great value to the company. The rainfall in this section, amounting to 12 inches, is greater than anywhere else in the country, and a scarcity of water for the purposes of this country, for a year or two to come, need not be apprehended.

**NEVADA.**  
**GRAND QUARTZ.**—*Tidings*, Feb. 10: Supt. Lord went down from the mine on Wednesday, and reports everything in good shape there. The stopes are holding out the same as usual. The main lower drift shows a 20 to 25 inches thick of good looking quartz, and it grows larger as they drive into the mountain. The mill is kept running all the time, and he hopes soon to have the mine a dividend-paying basis.

**THE JOHNNY MINE.**—*Overland Alta*, Feb. 10: Supt. Lord is now at the mine, and is bringing to surface 50 tons of gravel daily, which is run through stamps for the more perfect extraction of the gold therefrom. A new drift has been opened, which is turning out good gravel.

**ALBION RANCH.**—This old mine, from which about 600,000 lb of gold was extracted in its prime days, and about which here believes it was half worked out, has been abandoned for the eastern market. It is expected that the mine will be resumed about the coming summer.

**PETRIUS IN MOUNT MONTE.**—*Nevada City Transcript*, Feb. 13: The Blue Tent and Safford Flat hydraulic companies are making things fairly "hum" out their way, under big new monitor for each claim has just arrived via the Narrow Gauge railroad. These mines annually produce thousands upon thousands of dollars' worth of bullion, not one cent of which goes to the "foreign countries" that are so much the business of the mining companies. The companies owning them contribute greatly to the prosperity and wealth of Nevada City, and eventually the good of the State at large.

**THE KIRKHAM MINE.**—*Nevada Transcript*, Feb. 20: The miners of the Kirkham & Hitchcock claim, at Blue Tent, have their new incline down 120 ft, and are following the ledge, which is 1 ft thick and very compact, through hard rock. The poorest rock recently from the ledge in this claim, has yielded 80 to a ton, while numerous "sugar plums" are found where it pays as high as 50 cts a pound.

**PROSPECTING FOR THE BIG WHITE LEAD.**—The Pearl mine, Tom and Jack, have a force of 6 men engaged in mining a tunnel into Cement Hill, at the head of Long ravine, in the hope of recovering the old Cement Hill lead, which was lost several years ago by the original company after considerable gold had been taken from it. The tunnel is being run by different parties in the hope of finding the continuation of the channel.

**LOS RIOS CO.**—*San Juan Times*, Feb. 19: The Lone Ridge M. Co. are pushing their work to a state of completion very rapidly. They will complete their tail-flume and undercurrents within the next 2 weeks, probably. Their ditch, which commences at or near Kilroy's ranch, at Clerke, is nearly completed. About 200 ft of 15-in iron pipe has already been laid down and the manufacturing of pipe still goes on.

**LACER.**  
**NORTH RAVINE.**—*Placer Herald*, Feb. 10: The Crandall mine is being worked by J. R. Maine, who, we understand, has out several tons of very promising looking rock. Roberts & Roberts, having been driven out of their shaft surface water, are engaged in running a tunnel to tap the ledge, the lay of the country being very favorable for such an undertaking. Keenhor & Crosby, on the east extension of the Shurtliff, have struck rich ore, and have very prospect of a very good mine.

**THE MYSTIC MINE.**—This is the name given to the late mine and shaft of Sam New, Nevada, showing very encouraging signs. They are down some 35 ft, the ledge of a good size, with even wall, the ore is uniform and will yield, it is thought, from \$30 to \$40 per ton. **IMPORTANT PURCHASE.**—The Schnabel boys, August H. and Adolph, have purchased from Geo. D. Aldrich the old Patrick mining property, including the famous Orater mine and hoisting works, the excellent 15-stamp mill, and the burning house, which the other proprietors have been holding out for sale. They have already over 40 men at work and are running the mill to its full capacity. The Schnabels are a steady, industrious and energetic young men, and are of first class miners, having been raised virtually in a quartz mine. They will give their personal attention to the management of this property.

**LUMAS.**  
**SAVROCK.**—*Greenville Bulletin*, Feb. 19: The new mill is in active operation, and doing good work, to the satisfaction of the Superintendent and owners. **ORENS MOUNTAIN.**—The breaks in the ditch, mentioned last week, were repaired last week, and both mills are running.

**INDIAN VALLEY.**—The working tunnel is being driven as fast as labor can forward it. Owing to the stopes not extending as far as thought of in the beginning, more time is required in making the connection. A full force of men are retimbering the Indian Valley shaft from the 200 level. The mill is in complete running order.

**LUMAS NATIONAL.**—The sulphurets works recently built at this mine, on Wednesday last, and works splendidly. The huge revolving furnace runs perfectly smoothly and fully up to expectation. The chlorination of the roasted sulphurets have commenced, and in a few days the whole process will be successfully running. Assays show the sulphurets to be valuable, and now that the company has the means of treating them, will soon make a profitable mine again. This is one of the most important of a lot of mines now being constructed in this section of the State, and the company has our best wishes for its success.

**GRANITE BASIN.**—Lively times are expected next spring. There are several rich claims in the Basin, 5 of which are quartz mills now up, or in process of erection. Among them are the following: See & Jolly, 4 stamps; Vard & Co., 8 stamps; A. P. White, 8 stamps; Amest & Co., 10 stamps; Morgan Williams, 10 stamps. The latter company, which has put in a complete mill, and will be ready to start as the weather will permit. In the mill of Amest & Vard, after a six days' run, the small little sum of \$400 was produced. The sulphurets are quite rich, and evidently will require the use of concentrators and a furnace. In this connection we would remark that we believe the general introduction of concentrators and furnaces in localities where sulphurets abound, will result in a much larger yield of bullion. They are rapidly showing their utility.

## SAN BERNARDINO.

**OUNSIOR.**—It is now reported as a fact that the celebrated Lost Sunlight lode has been found by a prospector named by D. O. Mills. He is said to have become possessed of a lot of old papers and charts, including a description of the locality in which the unfortunate Dutch Valley party found the renowned lead. It is said to be about 60 miles from Resting Springs, in San Bernardino county. The lode discovered is from 20 to 30 ft wide, and crops out 20 ft, and has been traced for 3 miles. It was always a cherished desire with the remnant of the unfortunate party, most of whom perished in Death Valley in 1849, to find the lost lode. The late John Smith, who was one of the party, was always enthusiastic about the lost lode. He was one of the original discoverers, and was firm in the belief that it was the richest mine ever seen by man. "If it is within only 60 miles of Resting Springs," adds the same paper, "it is astonishing that Josh Talbot, or some other of the survivors of the desert have not stumbled on it." Under the lost lode has been seen a number of buried times in the course of his prospecting wanderings during the past 25 years. "We do not think they have got the right Sunlight yet; it is in a small detached mountain, the nearest water being about 25 miles distant. So one of the original discoverers told the writer hereof years ago."

## SIERRA.

**BLACK JACK.**—*Nevada City Herald*, Feb. 17: Supt. J.

W. Young, of the Black Jack mine, which property is situated a short distance from Forest City, is losing no time in developing this valuable claim. The rock in the tunnel that he is now driving being very hard and preventing rapid progress being made, he has concluded arrangements for putting in a Burleigh drill, which is to be worked by water power. The compressor will be geared on the mill wheel some 500 ft below the mouth of tunnel No. 3, where the men are at present working. Said tunnel is now about 200 ft. After starting the Burleigh drill, Supt. Young anticipates cutting the vein in 40 or 50 days, or when time the mill will be completed. From that on, he says, the mine will yield dividends. At present there are 10 men employed, and the adoption of the Burleigh drill will not necessitate the increase of labor; consequently there will be no extra expense attached, more than the purchasing of the drill. The progress of driving the tunnel will be increased by 5 or 6 ft a day as to that heretofore.

## TUOLUMNE.

**DISCOVERIES.**—*Tuolumne Independent*, Feb. 18: We have been told of some fresh, rich discoveries in the upper belt, in proximity to the Gold Hunter mine. The ledge has been traced for 3,000 ft, showing gold freely. We examined some really magnificent specimens from the celebrated Osen mine. This is really a wonderful discovery, and the fact that the ledge had been traced for 3,000 ft in this mine in all and every form. The Spring Gulch mine is drenched out, and will not attempt to do more work until the storms are over. Regarding the Knox & Boyle, on the mother lode, we hear that they are about to rebuild and enlarge the over-shot wheel of this company to 40 ft diameter, also thoroughly overhaul the 10-stamp battery to be used as a prospecting mill.

The Republican almost ran, on the mother lode, near Jacksonville, has been purchased by Mr. William Lenon for \$300. The property, under the ownership of the present gentleman, will be speedily developed. He will have a good head of water until July next, and purposes to wash off all the free gold that is known to exist in the decomposed slate matter and quartz veins, which will doubtless pay well.

The Sonora mine is crushing at Seiber's mill. Plates look well for good pay in free gold. The concentration is doing good work.

**KENNEBEC HILL.**—"It never rains but it pours," says a Columbia correspondent: John Griffin and John Gerber have struck a good pocket lead on Kennebec Hill, across Main gulch. They obtained \$90 in one pan; since then they have been taking it out very rich. No one knows the exact amount, as they have quiet tongues; Dame Rumor has it all the way from \$2,000 to \$3,000. He further says: "The outlook for the coming season in this section in mining matters is very flattering. A number of mines have been sold to capitalists, and a great many have been bonded by various parties, and he looks forth to a genuine mining boom—one that will inaugurate a proper system in mining matters."

**SOUTHERN MINE.**—Mining operations are at present down to zero in this vicinity, but with bright prospects looking up in the spring, we still have for the "good old time coming." The reduction works have shut down for the present, on account of the bad weather, the roads being in such a condition that it is impossible to haul quartz to the works. The Monte Cristo mine has also ceased operations on account of the water coming in faster than it can be hoisted with the windlass. The company is about to put up an engine on the mine, when operations will again commence.

## NEVADA.

### WASHOE DISTRICT.

**UNION SHAFT.**—*Virginia City Enterprise*, Feb. 20: Cutting at this station, on 2000 level, repairing drift at 1600 level, and easing timbers at the 1900 and 2500 station.

**UNION CO.**—On the 2500 level the joint Mexican west crosscut has been extended 10 ft; the joint Mexican east crosscut has been advanced 20 ft, and the joint Sierra Nevada east crosscut 25 ft.

**OPHIR.**—On the 2500 level the joint Mexican east winze has been sunk and timbered 18 ft; the joint Mexican west drill hole has been extended 170 ft, cutting at timbering. The joint California east crosscut has been extended 49 ft.

**HALE & NORCROSS.**—The reconstruction of our hoisting works is completed. Have been for the past week engaged in cleaning up the shaft and incline, and find the ho-bits considerably damaged. The slower and compressed air pipes will have to be replaced for about 700 ft in the shaft.

**MEXICO.**—On the 2500 level the joint Ophir east winze has been sunk and timbered 18 ft; the joint Ophir west drill hole has been extended 170 ft.

**SIERRA NEVADA.**—On the 2300 level the upraise has been advanced 22 ft; total length, 562 ft. Ore raised during the week, 322 tons; average assay value, \$101 per ton.

**ALTA.**—Since last report the shaft has been sunk and timbered 25 ft. Water in the shaft is increasing threefold, owing to the Silver Hill company pumping it into the Justice company's works, all of which runs through into the Alta company's shaft. I have notified the Superintendent of the Justice accordingly.

**CALIFORNIA.**—On the 2500 level the joint Ophir east crosscut has been extended 40 ft; the joint Con. Virginia west drift to the C. & C. shaft has been extended 34 ft; and the joint Con. Virginia east drift from the C. & C. shaft has been advanced 11 ft.

**CON. VIRGINIA.**—On the 2300 level the south lateral drift has been extended 5 ft, and are now cutting out a chamber for the joint Best & Belcher upraise.

**SUTRO TUNNEL.**—Main Tunnel—General repairs have been made along the main line. North Lateral—During the last week it was found necessary to do very little work in this drift to keep it in repair. South Lateral—The retimbering and repairing has been continued, and the faces are ready on the 14th inst., and work resumed in driving ahead. The repair shifts were engaged a portion of the time in easing and doubling up the timbers for a distance of about 50 ft, which were put up the week previous; also 30 ft of ground has been cut out and retimbered. The west half of the face is in adit, and the east half is in decomposed porphyry, with clay seams. The hot water is decreasing.

**EXTRA.**—The face of the tunnel, 3,500,000.

**YELLOW JACKET.**—During the past week have extended the Suto tunnel level drift 80 ft, making the present length of the same 420 ft from the switch, or 400 ft from the center of the shaft to the face. The ground continues quite dry, with numerous clay seams. We are obliged to keep the drift well timbered close up to this face. The Suto Tunnel Company has resumed the work of driving in near the south leader. The distance between the 2 faces is about 450 ft. Machinists are employed on repairs to the pump engine. Both centers or disks of the new fly-wheels are in place and keyed.

### ESMERALDA DISTRICT.

**NEW ESMERALDA.**—*Herald*, Feb. 19: Work still goes on in developing this property, and every day's work done makes the mine look better. In the bottom of the shaft sunk on the Helen No. 2 claim, the ore is very rich, and shows gold very plainly. A drift is now being run from the ravine that crosses this claim into the main hill. Another man was put to work to-day on this property, making a force of five men at work at present.

**EXTRA.**—The incline is down 55 ft, and a drift has been started on the ledge running to the main ledge.

### EUREKA DISTRICT.

**BOSTON & EUREKA M. Co.**—*Sentinel*, Feb. 19: A company has been organized in Boston under the above title, and have purchased the Ventura series on the north side of Adams' Hill, and the work of developing the property will be begun as soon as the weather permits. The number of shares is placed at 125,000, at a par value of \$4. The mine will be under the supervision of Mr. Nathaniel Diamond, one of the most thorough and practical miners in the district, and who made the Ruby-Dunderberg a successful and dividend-paying mine.

**THE NORTHWESTERN.**—The recent developments in the Albion prove that the trend of the ledge is into the above property, and that the stockholders are somewhat jubilant.

The indications are that it will yet prove a valuable mine.

**SMOKER IN THE EUREKA CON.**—The Eureka Con. has been affected by the smoking argument now going on between the Richmond and Albion, the fumes having penetrated the mine through its connection with the Richmond. As yet it is not serious, but sufficiently unpleasant to make the miners wish that other tactics had been resorted to.

### MILLER DISTRICT.

**NEW MINES.**—*Cor. Plumas National*, Feb. 19: I just saw a man here who had had money made in the new mines in the Miller district, 100 miles east of here, and 70 miles from Wadsworth. His reports that new discoveries have recently been made which promise to be very rich. There is little doubt but what there will be a big rush there in the spring. Ten or fifteen men are stopping there permanently, with many coming and going all the time. No feed for horses nearer than 25 miles, and the "houses" are burrows carried in the hills—covered with canvas. Lumber will have to be transported from Wadsworth. There is plenty of juniper, but no other timber.

### ARIZONA.

**SHUT DOWN.**—*Arizona Citizen*, Feb. 13: The Con. Arizona mill, at Arivaca, has been shut down, probably for a month or two, pending settlement of some company difficulties. The men were all paid off, and a number of them arrived in this city this morning. Supt. McCafferty is here, en route to New York.

A new mining company has been recently organized in New York to open a group of mines in the Sierritas.

Many fine prospects exist in those mountains, and the developments anticipated at the hands of this planter company are expected to give that region quite a mining boom.

**CALIFORNIA DISTRICT.**—The Texas mine is still being developed rapidly as much money can be accomplished. It is becoming more valuable daily. The main shaft is now down 140 ft, with drifts at 95 and 100 ft. There is also a tunnel in 110 ft, which requires but about 80 more to tap the ledge at a depth of 240 ft. The smelter to reduce the ore of this mine is now daily expected, the grading having been completed, timbers on the ground, coal burned, and everything in order to commence operations immediately upon its arrival.

Several other companies are being organized to work mines in the vicinity, 2 of which, the Chiricahua company and the Congressional mining company, the former of California and the latter an Eastern company, have already secured a number of fine prospects. The Roman Beauty mine, owned by the Congressional company, is considered as fine a prospect as there is in the camp. This company has also secured a number of others that are prospectively as valuable as any in the Territory, not excepting those of Tombstone. Besides the mines of these companies, there are from 500 to 1,000 locations, nearly all of which have more or less work done on them, and many of them showing as well as any that have been sold. In fact, there are mines enough here, where the prospects are sufficient to warrant extensive development, to keep busy 20 companies instead of 3, and we will have that many, too, within 3 months. The prospectors are nearly all at work on their claims, getting ready for the boom which is sure to come with warm weather and Eastern railroad connections. Galeville is fast assuming the proportions of a metropolis, there now being half a dozen stores, 3 lodging houses, a first-class hotel, and restaurants and saloons almost without number.

### COLORADO.

**KERBER CREEK.**—*Cor. Silver Cliff Prospect*, Feb. 11: The snow is fast disappearing at Bonanza, but information comes from Little Kerber that in that vicinity "the beautiful" is about 3 ft deep. In all probability no prospecting can be done until the first of April. The Columbia and Betty Boy claims in the vicinity of Little Kerber, are both showing very well in sulphurets. It is reported that the former was sold to Denver parties for \$10,000. The East Eastern, down 10 ft, a well-defined lead, carries rich silver, a picked assay from which gave a return of 2,600 ounces per ton. The Tiptop, Crosscut, and Superior lodes, in Rawley Gulch, near Bonanza, are being actively worked, and are all showing up finely. The latter has an 8-ft vein, of which has been struck in the Mount Joy, in the same locality, is down 50 ft, and shows a large vein of galena and gray copper, running on an average about 60 ounces. At 7 ft the highest assay was but 7 ounces. The Commonwealth company, of Ohio, represented here by Major I. N. Strong, has a fine group of 15 claims at the head of Alder creek.

**QUERINA.**—I have come to the conclusion, after considerable observation and study, that what is most needed here is a concentrating mill. That the mineral is here has been demonstrated beyond a doubt. If some one with capital would come here and erect a concentrator, it would pay handsomely on the investment, and prove a God-send for the camp. If the mill was located near what is known as Poison Springs, there would be a sufficient supply of water, and it would be surrounded on all sides by the numerous rich mines on Dutch Flats, which would all have the advantage of shipping the ore down hill. The Mountain Boy claim alone, the ore in which is low grade, would keep one mill running. We have mines enough here in which there are enormous quantities of low-grade ores, to keep several concentrators running night and day, and certainly we have men enough who need employment. The Whistle mine, owned by Melrose & Beta, has been sold to the Bell company for \$75,000. Briggs & Day have struck it rich in the Mid. light lode. The Belle of the Gulch and Copper Bottom lodes are attracting considerable attention, and all the ground in the vicinity has been taken up as far as Gould's reach.

### IDAHO.

**CUSTER.**—*Yankee Fork Herald*, Feb. 12: The bum and rattle of the General Custer mill stamps is the music that now salutes the Custerites' ears at all hours of the day and night. It is the right kind of music, for it is silvery tones. Col. Hyde is kept busy in keeping everything in running order at the mill, but he knows his business, and everything is working well.

**YANKEE FORK.**—Several Yankee Forkers are in the East for the purpose of selling mines, and some transfers are looked for soon. The clean-ups from the Custer mill will be an incentive to capitalists to invest in our midst, and will help the agents in making sales. Those who wish to sell mines should not get excited and ask visionary prices for their ledges. They should ask what they are really worth—dead just as they would in selling stock or merchandise. If such a course is pursued, several sales will undoubtedly be made, and we have a boom in a few months that is a boom.

**ORE.**—We understand that a vein of fine ore has been struck in the Silver King mine, owned by Samuel Holman, James Donnelly and Oliver Blawett. The location of the mine is northwest of the Custer City.

**WOOD RIVER.**—*Cor. Salt Lake Tribune*, Feb. 16: This town of Ketchum, from where I write, has more natural advantages than any town on the river. This place is destined to become the base of supplies for the mines above here. We have a good saw-mill, 3 miles above town on the river, and a few good sites for smelters; and plenty of timber for building purposes. There is also a smelter, to be run by Salt Lake parties. We have plenty of ore on hand, and expect to have enough to run 2 or 3 smelters. Our winter has been mild so far, very much like the winters in Utah, excepting a little more snow. Our camp is full of life, fun, and business. Miners are coming in daily for their supplies on snow shoes. One can carry from 40 to 60 lbs, and can travel from 15 to 20 miles per day.

**APRIL.**—*Idaho World*, Feb. 12: The shaft sunk last fall by the Elmira company, at Banner, was tapped 2 or 3 days ago by the tunnel that was started in for it about the middle of last November. The men at work in the tunnel were notified by the seepage of water that only a few feet would have to be run to make the connection. A

hole was drilled in a distance of 10 ft and 7 sticks of giant put in and fired off. This stopped the seepage, and one of the men commenced picking. A few licks tapped the shaft, and the water started, likewise the man with the pick and two who were filling up the car. It was a race of 350 ft. The water rushed through furiously, but the men made good time, and reached the mouth of the tunnel a little ahead. The force of the water started a lively current of air—so strong that the men could scarcely keep on their feet. The back set of timbers was carried away and the car smashed to pieces. There was 80 ft of water in the shaft, besides 110 ft of tunnel, leading from the bottom of the shaft to the ledge, being full.

### MONTANA.

**THE ORANITE MINE.**—*Helena Independent*, Feb. 12: In November last this property was bought by Mr. Charles McCullo, in the sum of \$40,000; since which time he has had from 12 to 15 men at work on it, with results said to be entirely satisfactory. Our informant says "the mine was first run a distance of 115 ft in a 4 ft lode of free milling ore, carrying from 60 to 100 ounces of silver to the ton. Then a shaft was sunk at the mouth of the tunnel 67 ft deep, and from the bottom a level was run 70 ft in the same grade of ore between walls 4 to 8 ft apart. The shaft will be continued 75 ft deeper, where it will meet another shaft, through which the ore will be taken." The work contemplated will open up 20 ft of ground in which the ore, besides being rich in silver, carries from \$8 to \$9 of gold per ton.

The Hope company, under the supervision of Mr. Chas. Clark, is working the Emma mine, recently purchased from Holland & Estill, on Hope Hill. The Hope mine is abandoned—no ore in sight. On the Cliff mine this Hope company is working from 10 to 12 men.

**ALGONQUIN CO.**—The Algonquin mill is running on Salmon and Trout ore. No ore at present is being raised from the Algonquin mine, owing to the change being made from horse to steam power. The hoisting works just being finished for the Algonquin mine are among the best and most powerful ever erected in Montana Territory. The machinery was made by Orinith & Wedge, of Zanesville, Ohio, and is of the latest and most improved pattern. It is proposed to open the 000 level during the present year.

The Speckled Trout is being worked as usual.

**STEVENS MINE.**—One of the most important mining transactions in Butte for the past 6 months is the purchase, by Messrs. Daly, Pardee & Davis, of the Stevens mine. This mine has been a constant producer of ore for the past 4 years, and in that time has netted its fortunate owner, Mr. John Sisson, many thousands of dollars. The purchase price was \$300,000 cash, the purchaser taking possession at once, and are now actively developing the mine below water level. They are sinking 3 shafts. Should the developments meet expectations, Butte will soon have another large quartz district.

**THE EMPIRE, OF SILVER CREEK DISTRICT.**—An extension of the famous Drum Lummond, on the east. A shaft, now 60 ft deep, will be extended to a depth of 80 ft, and if the prospect, as estimated, the same good ore is found, a tunnel will be run to tap the lode at a depth of 200 ft. At present working, the lode is 4 ft wide, with the hanging wall well defined, and half the width of the vein matter is high-grade silver ore, and the entire distance carries gold enough to pay well.

The Alta Montana ores keep on improving in lead percentage, as well as in silver value. The mine is so dry as to admit of their keeping their ore in the open air, and the sediment which covers the product extracted from wet mines.

### NEW MEXICO.

**SOCORRO.**—*Las Vegas World*, Feb. 13: Col. T. B. Mills returned from Socorro yesterday. The Colonel reports the prospects in the "Wheel of Fortunes" are fully better than when the first strikes were made. The shaft is now down 84 ft and work is being rushed. The tunnel is being run into the side of the mountain, and has now reached a point 305 ft from its face, and if the dip of the "Wheel" shaft is as good as estimated, the shaft will be completed in about 100 ft further on. This will be reached in about 30 months, although the rock is growing harder and harder. An 8-inch vein of chlorides has just been struck in the tunnel, of the same grade as that found in the shaft of the Wheel of Fortune.

**SANTARITA MINE.**—North of the Aucon tunnel is located the above mine, and is owned by Antonio Aboytia and F. A. Manzanarez, of the firm of Brown & Manzanarez, at a depth of about 30 ft. A vein of ore 2 ft in thickness was struck of argenticiferous galena, assaying \$30 in silver and 60% lead per ton; they have considerable ore on the dump, and the prospects are very flattering that this may become a very valuable mine.

**SOCORRO TUNNEL.**—This tunnel crosses the mines known as the Strong, Wheel of Fortune and Chief Victoria. There are 13 men at work on both day and night shifts. The tunnel has reached a depth of 220 ft, and 136 ft of this work has been accomplished within the last month. At a distance from the face of 265 ft a lode of 1 ft in thickness, carrying chlorides of silver, was reached. The Chief Victoria mine has reached a depth of 50 ft in cap rock, the lode has not yet been reached. In going the above distance a vein 1 ft thick, carrying sulphurets of iron, was passed through, and the rest of the district was quartzite and lime-stone, filled with argenticiferous galena and iron pyrites.

The Socorro and Rufina mines are located north of the Socorro tunnel and are the property of the Manzanarez Mining and Industrial Co. Work will be renewed at once upon these mines.

The Franklin tunnel is north of last named mines, and the tunnel has reached a depth of 70 ft during the past month. A vein of low grade ore has been struck, but the vein looked for will not be reached under 100 ft from the present work. With the development of all the above mines and their close proximity to the railroad, being only 3 miles, no doubt the Socorro mountains will show the best paying mining district in the Territory.

**BLACK RANGER.**—No prospecting has been done since the first Indian alarm, the miners all remaining grouped together for common protection. Quite a number of miners are now making arrangements to send in men, who will undoubtedly be safe enough, as they will give the reds a high fight if they are tackled.

**THE MOGOLONS.**—The mines in the Mogollon mountains are showing up high, and rich strikes are being continually made. There are many old miners from Arizona and the Pacific slopes going in, and everything looks bright and hopeful. No Indians have, as yet, been seen in the range. The shaft of the celebrated Conney mine has been sunk to a depth of 220 ft. It is reported that a vein of wire silver 3 ft wide has been found in the mine.

**ROCK ISLAND DISTRICT.**—*Herald and Southwest*, Feb. 10: Lem. Andrews, who came in from Rock Island district last Wednesday, reports numerous locations and some developments in that vicinity. The ledge is well defined, and generally found covered with iron. The eastern slope of Cook's range is pretty well taken up. The ore is principally galena, with indications of running into sand carbonates. Assays of surface rock range from 30 to 40 ounces.

**TRES HERMANOS.**—Wm. H. Wray, who has just finished smelting and refining 2 tons of ore from the Cincinnati mine, Tres Hermanos, reports that he has struck a number of good veins, and that 100 ounces of silver to the ton. During the week he has received 2½ tons additional from the same mine. This last lot is better looking ore than the first and is literally full of horn silver. All the mines are looking well. The veins are opening out and showing a better class of metal as work progresses. The owners of the Hancock are making arrangements to ship a considerable quantity of ore to San Francisco. Numerous wells are going down and water is being struck in all the mines. There is a fair prospect that a smelter will soon be erected.

It is the intention of the Southern Pacific Railroad to build a suspension bridge across the Salinas river in the spring.



## Physical Studies of Lake Tahoe.—No. 9

[Written for the Press by Prof. John Le Conte.]

## Formula for Time of Oscillation of Seiches.

The researches of Forel seem to prove that "seiches" belong to that class of water-waves in which the wave length bears a large ratio to the mean depth of the water.

This mathematical investigations of Sir G. B. Airy, and other physicists, show that, under these conditions, the time of one semi-oscillation of such a wave is given by the formula— $t = l \div v \times g$ : In which

( $t$ )=Time of semi-oscillation of the "Seiche."

( $l$ )=Length or breadth of lake according as the "seiche" is longitudinal or transverse.

( $d$ )=Mean depth of lake, along direction of oscillation.

( $g$ )=Acceleration due to force of gravity.

The preceding formula shows that the duration of "seiches" is directly proportional to the length of the lake, and inversely proportional to the square root of its mean depth. Forel has shown that the results obtained by this formula accord approximately with the observations of "seiches" in Swiss lakes.\*

## Lake Tahoe.

From inquiries made of the inhabitants of the shores of Lake Tahoe, I was not able to discover that any rhythmic oscillations of the level of its waters have been noticed. Some residents declared that they had observed sudden fluctuations of level, which, from their suddenness, they were disposed to ascribe to disturbances of the bottom of the lake due to volcanic agencies; although they were unable to co-ordinate such oscillations with any earthquake manifestations on the adjacent shores. It is evident, however, that until arrangements are consummated for recording systematic observations on the variations of the level of this lake, we cannot expect that its "seiches" will be detected. Of course, self-registering gauges would give the most satisfactory results; but any graduated gauge systematically observed would soon furnish evidence of the phenomenon. For the longitudinal "seiches," "Hot Springs," at the northern extremity of the lake, or "Lake House," at the southern end, would be eligible stations for gauges; and for the transverse "seiches," Glenbrook, on the eastern shore, or Capt. McKinney's on the western margin, would afford good stations. As far as I am aware, "seiches" have never been observed in any of the American lakes. This fact is the more remarkable from the circumstance, that long-continued and careful observations have been made on the fluctuations of the level of several of the large Canadian lakes, with a view of testing the possible existence of lunar tides. Perhaps these lakes may be too large to manifest the unimodal rhythmic oscillations which have been so successfully studied by Forel in the smaller lakes of Switzerland. Be this as it may, there can be no doubt that Lake Tahoe is a body of water, in all respects, adapted for the manifestation of this species of oscillation, and that, like the Swiss lakes, it is subject to "seiches." Indeed, the far greater simplicity in the configuration of the basin of Lake Tahoe than that of the Lake of Geneva must render the phenomena much less complicated in the former than in the latter.

In advance of any observations it may be interesting to put on record the probable duration or period of oscillation of the "seiches" of Lake Tahoe. Such theoretical provisions or anticipations, may be verified or disproved by future observations, and in order to apply such tests, it is convenient to have numerical results presented to the observer. In the formula, previously given, expressing the time of one semi-oscillation of the "seiche," all the factors can be readily determined, in relation to Lake Tahoe, excepting the mean depth or ( $d$ ). For this lake we have the quantities indicated in the formula, as below:

( $l$ ) Longitudinal=21.5 English miles=34,600 meters.

( $l$ ) Transverse=12 English miles=19,313 meters.

( $g$ ) At latitude 39° and 1,904 meters above sea-level=9.794,808 meters per second.

The following table has been calculated by means of the formula, by assuming the several mean depths indicated in the table. The duration of one complete oscillation ( $2t$ ) is given in the table instead of the value of one semi-oscillation ( $t$ ), for both longitudinal and transverse "seiches" in Lake Tahoe.

LONGITUDINAL SEICHES.			TRANSVERSE SEICHES.		
D. in Meters.	2 T. in Seconds.	2 T. in Minutes.	D. in Meters.	2 T. in Seconds.	2 T. in Minutes.
450	1042	17.4	450	582	9.7
425	1073	17.9	425	599	10.0
400	1106	18.4	400	617	10.3
375	1142	19.0	375	637	10.6
350	1182	19.7	350	660	11.0
325	1226	20.4	325	685	11.4
300	1277	21.3	300	713	11.9
275	1333	22.2	275	744	12.4
250	1393	23.3	250	781	13.0
225	1474	24.6	225	823	13.7
200	1563	26.1	200	873	14.5
175	1671	27.9	175	933	15.5
150	1805	30.1	150	1006	16.8
125	1973	33.0	125	1104	18.4
100	2211	36.8	100	1234	20.6

From the soundings executed by me along the greatest axis of this lake (nearly north and south), the mean depth of water along this dimension cannot be much less than 400 meters;

this would make the time of one complete longitudinal "seiche" about 18 or 19 minutes. The mean depth along the transverse dimension is, probably, considerably smaller, perhaps about 250 meters; this would make the time of one complete transverse "seiche" about 13 minutes. As soon as the duration of these rhythmic oscillations has been accurately determined by observations, the problem may be reversed; for the time being known the same formula may be used for finding the mean depth of the lake along its two principal diameters.

\*Forel's monographs on "seiches" of the Swiss lakes may be found in the several volumes of the "Archives des Sci. Phys. et Nat." from 1874 to 1880. We cite the following: Tome 49, p. 24, et seq; Tome 53, p. 281, et seq; Tome 57, p. 278, et seq; Tome 59, p. 60 et seq; Tome 63, pp. 113 et 189, et seq.

(CONCLUDED.)

## Miners' Wages and Low-Grade Ores.

## The Situation on the Comstock.

The question of the reduction of wages of miners in camps where \$4 a day is paid, is one which is being widely discussed. The men and their unions naturally oppose the reduction, while the mine owners urge it. At Silver Reef, Utah, and at Lewis district, Nevada, wages have been reduced and some of the mines closed down because the men would not work for less than \$4 per day.

Probably at no other place is the question so absorbing as one at Virginia City. The majority of the Comstock mines are not paying at present, and if a bonanza is not struck pretty soon—and even if it is—the camp will, before long, have to fall back on its low-grade ores. In this connection the San Francisco Report recently, under the head of "Information Wanted," said: Suppose the miners' wages were to be reduced from \$4 a day to \$3, would work representing more than the \$1 a day to each man be done in consequence, and would a reduction benefit or injure the mining district in which it might take place? That, it seems to us, is the question. It is one which ought to be capable of discussion without the introduction of personalities or demagoguery. Which would be best for Virginia City, 2,000 men working at \$3 per day or 1,500 working at \$4 per day, and the other 500 idling or working on a railroad elsewhere at from \$2 to \$1.50 per day? Is there ore in the mines which can be taken out at \$3 a day which must be let alone at \$4 a day? Would the mines be developed more quickly and the chance of finding ore be increased by lowering the wages? These are queries we should like to see answered, just for the sake of information and to know upon which side common sense and ordinary business considerations lie. We do not want politics, personal prejudices or sentiment to come in at all.

The Virginia Enterprise of last week, in answer to the above, has the following interesting article:

In reply to the above we will say that it is not intended to reduce the wages of all miners and all men working in and at mines from \$4 to \$3 per day. However, taking the first question as asked, we will say that there certainly would be a vast deal more work done, and such a reduction would therefore benefit the district and the business men in it, because there would not only be more work done in the mines, but there would also be more men employed and more men, women and children to feed, clothe and supply with all kinds of necessities; yet it is not in contemplation to reduce the wages of all, even though it would be beneficial to have more work done and more men employed, as it is conceded that it is worth \$4 per day, and more than \$4 per day, for men to risk their lives and injure their health by working in very deep, hot or dangerous places. The question: "Which would be best for Virginia City, 2,000 men working at \$3 per day or 1,500 at \$4 per day?" we believe to be answered by merchants and business men of all classes who are standing idle at the doors of their shops half of the time, and who are depriving themselves and families of things actually needed in order to pay their rents and keep their heads above water, if it has not already been sufficiently answered above.

## Ore and Wages.

"Is there ore in the mines that can be taken out at \$3 per day that must be let alone at \$4 per day?" Undoubtedly. The management of the leading mines too well understand their business to not know to a cent when they are taking out ore that is running them in debt. For a long time the ore taken out of the California and Con. Virginia mines has barely paid expenses. It was taken out merely to give men employment and to give that much more gold and silver to the world. The men who worked in these mines very well know this. Scores of assays were constantly made, and the greatest care used in every way in order not to do injustice to stockholders by bringing the mines in debt. All the ore that would pay for extraction and reduction, and pay the men \$4 per day, was taken out, or so nearly so that it finally became necessary to discharge 80 men from the two mines. Undoubtedly more ore could have been taken out had the men employed been working at \$3 per day. As it was, at \$4 per day, whatever rich ore was found was made to extract a great deal of poor ore by judicious mixing. If men were working for \$3 per day would it not have been an easy matter to take out and add a corresponding amount of poor ore with the rich?

It is not in the old bonanza mines alone that low-grade ores are to be found that would pay for working were men now idle, and hopelessly

so, allowed to go into them and earn the wherewithal to feed and clothe themselves and families. In every mine in which there has ever been found a bonanza that paid to work with men at \$4 per day, there are now bodies of ore left behind that would pay to work with men at \$3 per day.

"Would the mines be developed more quickly and the

Chance of Finding Ore be Increased by lowering the wages?" In answer to this we will say that in accordance with the plan proposed by those who have considered all sides of the subject, that part of the work on the lode would go on just the same as at present. About the same number of men would be employed in shafts and at prospecting in the deep levels as now, and the chances of finding ore at great depths would be the same as now. There would, however, of course be a chance of men working in low-grade ore bodies on the old upper levels striking into deposits of rich ore occasionally, and some of these might prove to be of a good deal of importance. Large or small, all would help to bring up to a workable average a considerable amount of inferior ore.

As we cannot always have bonanzas to work, it is about time for something to be done toward working the low-grade ores left behind. Hundreds of men are now idle who would be glad to work in the old upper levels for \$3, or even less than \$3, per day. That they are not allowed to do so is not only a wrong and a hardship to them, but also a wrong and a hardship to all those of whom these men and their families would purchase supplies. It is not the miners alone who have interests at stake and rights worthy of consideration in a mining camp. The butcher and the baker, barely existing and hanging on in the hope of something better, are quite as worthy of consideration as any other class of laboring men.

## What Should be Done.

In order to bring about the desired change and give renewed life to the Comstock, there is not the slightest necessity for creating any trouble or ill-feeling. All that is required could be amicably and satisfactorily arranged. Therefore, we do insist that in view of the dull times, general stagnation of all kinds of business and many hundreds of idle miners on the Comstock, it is about time for the leading mine management and the head men of the Miners' Union to get together and come to an understanding, by means of which employment may be given to those who are now asking for it, whose wives beg for it almost on their knees, and whose children cry for bread because work is not to be obtained.

It should not be a difficult matter to so arrange as to let men go to work in those places along the lode where at present a miner is not seen, or ever will be, if things go on as now.

It is not in contemplation to ask a reduction of the wages of men who are working in the deepest levels, in shafts, and in other hot and dangerous places. Plenty of men are now getting more than the \$4 per day demanded by the Miners' Union. At least 70 men in the employ of the bonanza firm are getting \$4.75 per day, and at all the big shafts and works on the lode are a proportionate number of men who are receiving the same pay.

It is not intended to reduce the present

## Wages of Men Working in Shafts

Of any depth. About a mine there are many kinds of work to be done. Some kinds of work require to be done by experienced miners, and other kinds can be done by any one capable of handling a shovel, pushing a car or trudging a wheelbarrow.

There are in this city hundreds of boys who are growing up as hoodlums, or in danger of so doing, who should be allowed a place in which to learn something of the business of mining, and to earn something toward the maintenance of the families to which they belong. How many miners are there toiling in the sweltering lower levels, a portion of whose wages goes to feed, clothe and support sons who are growing up in idleness, and worse than mere idleness! A place should be found for these and for men who are unable to endure the heat of great depths at some place on or near the surface. This being the case, it would be well for the miners to allow the first 500 ft. below the surface to be worked by men and boys at less than \$3 per day. A son earning \$2 or \$2.50 per day—\$60 to \$90 per month—would add greatly to the monthly income of his father's family. In this first cool, dry space of 500 ft. would be found room in which many a stout lad could exercise his muscle, learn habits of industry and earn money.

From the 500 level down to the level of the Suto tunnel it is proposed to pay \$3 per day, from that to the 2500 level \$3.50 and to all below the 2500 level \$4, as at present. Men working in shafts, no matter how shallow, the same as at present.

In case an arrangement something as sketched above can be made we can promise that lively times will be seen again on the Comstock almost at once. Where we now see buildings pulled down we shall then see buildings going up. As things now stand capitalists can do nothing. It would be useless for them to put up mills for the reduction of the low-grade ores unless they can first make arrangements for mining them. Some have started the story that there is no

## Low-Grade Ore in the Mines

That can be made to pay at the present wages.

This is sheer nonsense. If the ore will not pay, on trial, that at once ends the matter, and there is no harm done.

All miners who know anything about the Comstock know very well that there are vast areas of ore that can be made to pay. Even now spots in the old upper levels are being made to pay with men at \$4 per day. If there are spots in these old levels that it will pay to mine with men at \$4 per day, the spots can be very much enlarged and a proportionately large number of men and boys employed if but \$2.50 or \$3 per day be paid. Some 20 men have for sometime past been at work in the old upper levels of the Crown Point, and through recent additions the forces now numbers 40. These men are taking out ore which it pays to send to the Carson river for reduction. Hon.

C. C. Stevenson has long had men at work in the old upper levels of the Kentucky, old Imperial and old Jacket. If there is ore in these mines that will pay Mr. Stevenson a profit with men at \$4 per day, then there must be a far greater amount that will pay for working at lower prices for wages, and more mouths can be fed and more money given to the world than now.

In this city there are vast areas of low-grade ore in the Ophir, Mexican, Gould & Curry, Savage, Chollar and all the mines that have ever had bonanzas that may be worked, provided an arrangement can be made by which employment may be given to men and boys at less than \$4 per day. The ore which would pay a profit at higher rates for wages has been taken out by \$4 men, or at least was supposed to have been, for then as now all ores reduced were carefully sampled and assayed, and class calculations were made to avoid running a mine in debt.

In the Gould & Curry alone from the cropping down to the Suto tunnel level there is sufficient low grade ore to give employment to a great number of men and keep a mill running for several years. Should an arrangement be made for working this ore a mill would at once be put up, thus immediately giving employment to millwrights, engineers and laboring men of all kinds. This mill would be erected near the mouth of the tunnel run sometime since by the bonanza firm and the Virginia and Gold Hill Water Company from a point near the old or lower Gould & Curry tunnel. This tunnel is already completed and in good order. It goes through to the west wall of lode, and from the west end a shaft has been raised to the surface, which shaft is well timbered and in good condition.

## To Cheaply Work the Low-Grade Ores.

In order to cheaply work the low grade ores in this part of the mine it is proposed to send down the shaft a sufficient stream of water to elude everything down to the mill through a flume of proper size. All that came through would pass into and through the batteries, in which the gold in the loose dirt would be amalgamated, while the pulp would pass through proper concentrating and amalgamating apparatus. The tunnel was given a very steep grade on purpose for this.

At the C. & C. shaft a mill is already erected that could be used with some little alteration; at other mines proper mills would be erected at the most convenient points, while in others it would be found best to send the ore through the Suto tunnel to mills on the Carson river. But this could not be done at once, as mills must first be built there of such great capacity as to speedily reduce great quantities of ore of the lowest grade. A thing to be borne in mind, however, in all these calculations, is that a royalty of \$1 per ton must be paid the Suto tunnel company, let the ore come from where it may, from the top down to the lowest level.

Bonanzas are all very fine when we can have them, but some provision should be made through which a reasonable level of prosperity may be maintained at all times. Men are foolish to refuse beef and potatoes and go hungry because they cannot feast on turtle soup. If there is a place for one man to earn \$4 per day, there surely should be a place where his needy neighbor may be allowed to go and earn \$3, or in proportion to his strength and skill, without his \$4 neighbor having power to command him to sit at home in idleness in the midst of his ragged and hungry family.

## THE ORIGINAL PROSPECTOR.—The Mining

News, of Ruby Hill, remarks that the original prospector who sallies forth into untrodden districts, with a pick upon his shoulder, is fast disappearing. "It is somewhat strange," says the News "that the most complete lexicon of the English language ignores the existence and occupation of one of the most salient types of humanity to be found in the world. This oversight is, perhaps, pardonable, on the ground that his advent is comparatively recent—dating back to no further than two or three decades. The prospector, as Lawrence Stern said of the homunculus, is 'a being guarded and circumscribed with rights, and is as much and as truly our fellow-creature as my Lord Chancellor of England.' As such he is certainly entitled to a definition in the family dictionary. The prospector is a strange being. The genuine variety is exceedingly nomadic, and the oft-quoted line, 'Hope springs eternal in the human breast,' applies with triple force to the prospector; indeed, the possession of unlimited faith is very essential to his profession. The sole object of his life is the discovery of mineral treasures, in whatever form they may exist."



## The Flouring Industry of the Pacific Coast.

We trust our friends will find the following items of information not only worthy of careful perusal, but preservation for future reference. Much pains have been taken to arrange them in a clear, concise, and connected manner. Our readers will find them historical, in many respects, as well as statistical. Many facts are brought to light not generally understood by the people at large, while we doubt not that manufacturers and dealers themselves may read the whole statement with profit and pleasure. For the fund of information contained in the article, we are indebted to Horace Davis & Co., of the Golden Gate Mills, of San Francisco. These gentlemen stand in the foremost rank among the flour manufacturers of the Pacific coast, and are doing much to add strength to the great thews of our rapidly growing commerce.

During the past four years there has been a marked revolution in the flour manufacture of the East. It was formerly supposed that the most economical and satisfactory way of reducing wheat to flour was to crush the grain between the stones, remove the bran, and pulverize the middlings at the same time. By this simultaneous operation, all the dirt upon the wheat, all the brash and the germs, pulverized by the stones, were necessarily incorporated in the flour. It was found that the wheat grown about Minneapolis, when treated by this method, could furnish but a second grade article of flour, although it was capable of being made into the best of flour when differently handled. The old treatment is known as the "low grinding" method. It was only when "high grinding" was introduced that Minneapolis began to recognize the value of her wheat and her water-power.

The phrases "patent flour," "middling purifiers," and "gradual reduction," now so familiar to millers, were there brought to public notice through elaborate experiments at Minneapolis. Their flour at once monopolized the markets at fancy prices. Those who utilized winter wheat, realizing that this system could not redound to their advantage as it had done to their Minneapolis friends, were slow to adopt the plan in their own mills. In the end it prevailed, however, and now but few mills at the East pursue the old style of manufacture. Doubts similar to those entertained by the winter wheat men prevailed here in California. Our millers, although they eagerly watched the contest between the two systems at the East, were doubtful as to whether the strife would ever reach this coast.

There are certain differences in the characteristics of wheat, which prevent the advantages accruing to the patent plan at the East from ever being realized here. And yet, there has been a steady progress in our own systems, and in the same general direction as those in the East. Such mills in this State as make high grade flour, have introduced purifiers, and very much improved their manufacture. These changes have not been in the direction of economy, and it has required faith on the part of our millers that good work would eventually justify them in risking heavy expenditures.

The white skin of California wheat, when pulverized in the flour, is not so conspicuous, nor does it injure the flour like the skin of the Eastern wheat. Hence, the differences between poorly and well made flour are not clearly marked here as there; nor do the prices obtained for a choice article here rule so high, relatively, as at the East. The encouragements for good milling is, therefore, materially lessened. Nevertheless, our people have not remained inactive. On the contrary, many of the better mills have been substantially modified within a few years past, resulting in a great improvement of their high grade flour. The number of patented machines, methods and processes which have sprung up during this activity enables the miller to exercise his judgment as to what best subserves his purpose.

Besides the common millstones, Eastern manufacturers are using "roller mills," in which the grain is crushed between chilled iron or porcelain rollers, either corrugated or smooth. Chilled iron disks are also operated like mill stones, for which inventors claim great advantages. Whichever method is used, economical milling demands middlings purifiers for removing the dust from that portion of the middling which escapes the crushing process, and the patents on these devices are legion. It will readily be seen that it is no easy task for a miller to substitute a new method for one which he has used for a term of years. No one change can be made without entailing others; and yet, these machines have steadily crept into our mills in the face of a general disbelief in their being adapted to California wheat. Middlings purifiers of the most approved patterns are to be found in all our best mills, while rollers have been used in a few instances for some years. Money has been freely spent in striving to determine how far Eastern experience has been of value to us, surrounded as we are by so many essentially different circumstances. These experiments are not as yet conclusive, but their effect will tend to the improvement of our brands.

While this struggle has been going on within the walls of our mills, a change has manifested itself in one of two great markets for California flour. Heretofore, Hongkong has been a sort of reservoir into which all our offal and low-grade flour has been poured, and highly advantageous prices have been realized. But greater familiarity with the use of flour, on the part of the Chinese, has resulted in a nicer discrimination, and that market now readily absorbs

higher grades at remunerative prices, while low grades assume a similar position to that which they occupy in our own markets. The good prices paid for high grades in China is a standing encouragement to our millers to improve their brands; and it may safely be asserted that Hongkong, so far as its capacity goes, will continue to absorb the brand of any mill which may choose to maintain its uniformity of excellence.

There were exported from New York, in 1880, 4,176,839 barrels of flour, and 560,770 barrels from San Francisco. Liverpool absorbed the greater portion shipped from New York, and 166,201 barrels from San Francisco. Were it not for the uncertainty introduced into the calculation by ships' charters, which, during a scarcity of vessels, uses up all the margin of profit between San Francisco and Liverpool prices, there might be some hope for this trade. But it must remain speculative until the day when regular packet lines, with regular freight rates, shall be permanently established.

The nomenclature of the grades of flour have been somewhat modified by the new methods of manufacture in the East. Patent flour, in the sense in which that term is used, is made exclusively from the best purified middlings; and in its manufacture, the primary effect is to convert the wheat into middlings, and not flour, the process of pulverizing into flour being reserved for a second treatment after the dust shall have been removed from the middlings. "New process" flour is another term sometimes used. This refers to the process by which the flour is made, and the intention is to convey the idea that the article thus produced is really a "Patent" flour. "Granulated" is another term. "Patent" flour is generally granulated. The better flours of the "Washburn Mill" and the "Crown Roller Mill" are very coarse and sandy. Hence, the general impression would be that a granulated flour would be a "patent" flour. There is little justification for the use of these terms or brands from manufacturers now or heretofore on this coast. There are many brands in which the proprietors take pride, and which, measured by the grade, may answer to the quality designated by the above phrases; but our millers have not as yet been converted to the new process, and they hesitate to revolutionize their machinery to the extent demanded by the new process. Hence, one who is disposed to carp at trifles might ask if they mean the same by these terms that an Eastern miller would imply by their use. If so, their use is not fairly justified in brands on this coast.

—Pacific Rural Press.

## USEFUL INFORMATION.

**BLACK STAIN FOR WHITE WOOD.**—A dull deep black stain may be imparted to white woods by the following process: Procure some logwood chips and boil them in water until a strong decoction of logwood is made; brush this over the wood with a soft brush, and allow the wood to dry. Treat it two or three times in this way, and then let it get thoroughly dry. While it is drying, prepare a solution of acetate of iron by soaking some flakes of iron rust or old rusty nails in best white vinegar. It may even be best to prepare this solution first. This may be brushed over the wood in a similar manner to that for the logwood dye, when it will be found to turn the wood a deep dull black. It has been said that a small quantity of nut-galls, ground to powder and boiled with the logwood, improved the decoction. A solution of protosulphate of iron (green coppers) may also be used instead of the acetate of iron. When the stained surface is dry, it may be varnished or polished with a rag smeared with a mixture of beeswax and turpentine, or polished with French polish darkened with a little indigo. The decoction of logwood should be used hot; the other solution may be used cold.

**BURNED CLAY FOR RAILROAD BALLASTING.**—The Chicago, Burlington, and Quincy Railroad Company are burning clay for ballasting their road. A small fire of bituminous Iowa coal is started on the surface of the ground, and, when burning freely, the fire is covered with a lump of clay, then alternately coal and clay, the coal decreasing in quantity until at the top it is as one to fifteen. The mass is formed like a cone. Three united cones, each 18 ft. high and containing in all about 1,000 cubic yards of material, have been started near Red Oak. They will burn for months. Six hundred miles of road are to be ballasted with this crude pottery broken up. It resembles coal cinder, but is harder.

**BLEACHING STRAW.**—Plunge the straw tissue into boiling water, and let it remain in about ten hours. After that treat the straw during three hours with a solution of common black soap, with such force that when taken between the fingers it gives a greasy feel to the fingers. The temperature of this bath is maintained at 75° C. Take the straw out of the bath, squeeze, and then submit it to the brimstone chamber.

**METALLIC BELTS.**—A patent recently granted in Vienna and Berlin uses bands of steel, tempered and hardened, to transmit motion from one pulley to the other, the faces of the pulleys being turned perfectly flat and then faced with a varnish of resin, shellac and asphalt. The fastening of these belts are of a peculiar structure and can not properly be described without engravings.

**NEW WORLD PRODUCTS AND THEIR EFFECTS.**—Mr. Goodyear, in his work on gum elastic, significantly remarked: "It is a very curious reflection that the articles which have most affected the commercial and financial resources and conditions of the nations of Europe have been chiefly derived from the New World. We allude to the potato, to tobacco, the precious metals and cotton, and another article has sprung up which bids fair to be as important—caoutchouc." Mr. Goodyear's anticipations have already been verified in a remarkable manner, but the future has far more in store for the world as the results of its introduction and economical application.

**LIQUID FUEL.**—The *Nautical Gazette* states: We shall soon be able to announce a wonderful stride in the mechanical appliance for using liquid fuel for generating steam in both marine and land boilers. The matter is in the hands of practical men, who will soon demonstrate that they can make from 28 to 30 gallons of crude petroleum, costing from 80 to 90 cents, do the work of a ton of coal, costing from \$4 to \$4.25, and without dirt or smoke, and when, as in the case of a large steamer carrying from 40 to 45 men in the fire-room, one man each will be abundantly able to keep up a uniform pressure of steam at all times.

**A NEW STYLE OF CARD FOR WOOLLEN MILLS.**—A new invention makes the teeth of cards a little more than one-half the ordinary length. It is claimed by this that so much stripping is avoided, and that the wire does not retain the dirt and fibers as any other teeth do; that the ordinary card teeth are longer than is actually necessary to the carding operation, which is effected by the extreme end of the teeth. The new process uses steel wire, tempered and hardened and flattened, or needle pointed wire; the cards seldom requiring grinding, are very durable, etc. The invention is of English origin.

**PROCESS FOR IMPARTING A METALLIC GLAZE TO FILAMENTS.**—This process consists in coating the textile with a sulphurous substance containing a metallic salt. The fiber is impregnated with a liquor containing in solution metallic salts; immersion imparts the shade and glaze of the metals. After this immersion, the fabric is exposed to an atmosphere containing sulphuretted hydrogen, to fix the coating and develop the metallic color.

## GOOD HEALTH.

## When to Eat.

Felix L. Oswald is contributing to *Popular Science Monthly* a series of very interesting articles on diet, in which he furnishes some pretty strong arguments against many of the very generally received opinions which have heretofore been entertained in regard to this important subject, by even the most advanced of the medical profession. From the last issue we clip the following:

"Never eat till you have leisure to digest, for digestion requires leisure; we cannot assimilate our food while the functional energy of our system is engrossed by other occupations. After a hearty feed, animals retire to a quiet hiding-place; and the 'after-dinner laziness,' the plea of our system for rest, should admonish us to imitate their example. The idea that exercise after dinner promotes digestion is a mischievous fallacy; Jules Virey settled that question by a cruel but conclusive experiment. He selected two curs of the same size, age, and general physique, made them keep a fast-day and treated them the next morning to a square meal of potato chips and cubes of fat mutton, but, as soon as one of them had eaten his fill, he made the other stop too, to make sure that they had both consumed the same quantity. Dog No. 1 was then confined in a comfortable kennel, while No. 2 had to run after the doctor's coach, not at a breathless rate of speed, but at a fair, brisk trot, for two hours and a half. As soon as they got home, the coach-dog and his comrade were slain and dissected; the kennel-dog had completely digested his meal, while the chips and cubes in the coach-dog's stomach had not changed their form at all; the process of assimilation had not even begun! Railroad laborers, who bolt their dinner during a short interval of hard work, might as well pass their recess in a hammock; instead of strengthening them, their dinner will only oppress them, till it is digested, together with their supper, in the cool of the evening. In a manner essentially similar, mental activity tends to hinder the digestive process for a considerable time; and I believe, more especially, the digestion of the very substances that are often selected as brain-food *par excellence*. Even after a fashionable dinner of six or seven courses (*courses*, Dr. Abernethy used to call them), two hours of absolute rest will set our wits a-work again; but if that time be passed behind a double-entry ledger, a feeling of lassitude, often combined with an almost resistless somnolence, will advise the brain-worker that his vital energy is needed for other purposes. 'I could eat with more comfort if it wasn't for the consciousness of having to hurry back to my drudgery,' I heard a poor class-teacher say, and the same consciousness embittered the noonday-meal of millions of school children and overworked clerks."

The writer holds that the principal meal should be the last, and that it should be taken from 4 to 5 o'clock P. M., after the day's work is done. We might then have "pleasant conversation, and four blessed hours for digestion," before retiring for the night.

"It is an important rule that we should digest our food thoroughly before we replenish the stomach." He thinks that two meals a day are better than three. We can accustom ourselves to swallow three, or even six; but we cannot compel nature to digest them between meals taken so frequently.

The Greeks and Romans, during their prime as nations, contented themselves with one meal a day. The Gonaque Hottentots are in no way accommodated by a five days' fast, and live to old age on an average of four meals a week. Two meals, or one full one and two half ones, should be enough for any man; the last at night. Such a custom will best enable nature to do her work most perfectly. Eating, like everything else, depends on training—habit—and in no other respect is the human system so plastic as to the influence of habit.

**NEW TREATMENT FOR VARICOSE VEINS.**—According to the *London Lancet*, Dr. Linon, of Verviers, has used per-chloride of iron locally with great success during the last three years in the treatment of varices. The strength of the solution is about two and a half drams to eight ounces of water. Compresses of flannel are steeped in the water, then wrung out, and applied by means of a flannel bandage, which is only moderately tightened. This application is to be kept on 24 hours, and on removing it the surgeon is much surprised to find that the venous dilations have almost entirely disappeared. The applications are to be renewed for seven or eight days successively, after which time the bandage is to be kept on, without any further wetting, until it gets loose. It is then to be wetted again with the solution, and applied until the varices have disappeared, which generally takes place after eight days or a fortnight, according to the size of the swelling. This simple method has removed, in a few days, enormous varices, which were accompanied by violent pain, with black spots on the surface, and have restored the use of the limbs. By the unsuccessful application of dry bandages only, Dr. Linon has been able to show that it is not compression, but really the local action of the iron which is efficacious.

**NEURALGIA AS A "WARNING."**—The great prevalence of "neuralgia"—or what commonly goes by that name—should be regarded as a warning indicative of a low condition of health, which must necessarily render those who are affected with this painful malady especially susceptible to the invasion of diseases of an aggressive type. It is always essential that the vital forces should be vigorous, and the nerve power, especially, in full development. Neuralgia indicates a low or depressed state of vitality, and nothing so rapidly exhausts the system as the pain that prevents sleep and agonizes both body and mind. It is, therefore, of the first moment that attacks of this affection, incidental to and indicative of a poor and weak state, should be promptly placed under treatment, and as rapidly as may be controlled. It is worth while to note this fact, because, while the spirit of manliness incites the "strong-minded" to patient endurance of suffering, it is not wise to suffer the distress caused by this malady, as many are now suffering it, without seeking relief, forgetful of the condition it begets, and the constitutional danger of which it is a warning sign.—*Lancet*.

**RESTORING THE DEAD.**—Prof. Fort has presented the question of premature interments to the French Academy in a paper on artificial respiration. One fact he mentions is, that he was enabled to restore life to a child three years old, by practicing artificial respiration on it some four hours, commencing three hours and a half after apparent death. A similar case is reported by Dr. Fournol, of Billancourt, who reanimated a nearly drowned person after four hours of artificial respiration. This person had been in the water ten minutes, and the doctor arrived one hour after asphyxia. Prof. Fort advocates also the utility of artificial respiration in order to eliminate the poison from the lungs and glands. The length of time it is desirable to practice artificial respiration in any case of apparent death from asphyxia may be said to be several hours.

**KEROSENE AND SALT FOR DIPHTHERIA.**—A correspondent of the New York *Sun* says: "In 1862, on a plantation in south Alabama, where there was great difficulty in securing good medical advice, I saw a whole plantation of blacks, as well as the white members of a large family, successfully treated for diphtheria with kerosene oil and salt, used thus: Every patient was given a lump of rock salt about the size of a boy's marble, and instructed to keep it in his or her mouth, allowing the salty saliva. At the same time the throat was rubbed with kerosene oil, and a flannel saturated with kerosene kept around the neck until the symptoms were abated or entirely gone. If necessary, mild cathartics were given. Not a case was lost, and there were fully 150 in all on the plantation."



# MINING SCIENTIFIC PRESS

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## The Week.

The week has been one of sunshine and pleasant weather, and, as we write, it looks as if this would continue for some time. Spring will soon be upon us, and mining operations will then be proceeded with vigorously. Attention still continues to be drawn to the Territories south and east of us, and many miners are going in that direction. It is to be feared that many of them will be disappointed, as there are more miners in many of the camps than can find employment.

The miners' wages question still agitates several of our communities. In Virginia City it is a topic of the greatest interest, and is being thoroughly discussed. The *Enterprise* says it is a thing becoming more daily apparent, that the property-holders, business men and mass of the people of the Comstock earnestly desire to see the miners and managers of mines to get together and make some arrangement by which the idle in our midst may have an opportunity of supporting themselves and families. There is no earthly reason why this business may not be talked over as calmly and quietly by sensible men as any other matter affecting the welfare of this community. On both sides that should be done, and those concessions made, which seem best for the whole mass of miners and business and working people.

The difficulty between the Albion and Richmond companies, at Eureka, has attracted considerable attention from mining men, and when the companies took such steps as seemed liable to endanger the lives of the workmen, the Miners' Union stepped in and insisted that such proceedings should stop. As the matter now stands, committees from the Union are into the mines to see that neither company infringes the other's rights, until the affair can be settled by the courts.

THERE are 7,000 men at work on one section of railroad from the city of Mexico to Yoluca, and the section will be inaugurated in May. The Central railroad employed 110,308 laborers the last week in January.

## Desulphurizing Ores.

Probably there is no more important metallurgical improvement needed than a cheap, practical and satisfactory method of eliminating sulphur, arsenic, antimony, etc., from the ores of precious metals. Given such a process, and thousands upon thousands of tons of ore would be worked here and elsewhere every year, which are at present utterly valueless. To attain this object inventors are continually striving, and scarcely a month passes that we do not hear of some process for desulphurizing ores which is to do the work, sure.

Among the recent candidates for favor in this direction is a process having some peculiar features. The ore is ground up and mixed with crude petrolum or other hydro-carbons, this mass being then subjected to heat and flame in any suitable contrivance which will hold this material in position, and allow a sufficient supply of air to feed combustion of the hydro-carbon and of the gases generated by such combustion. That is, the heat and flame which is used is that which springs from the material itself and the air which feeds the combustion.

The mingling of the hydro-carbons with the ore in a finely divided state may be done by reducing the hydro-carbons to powder, or by employing them in a liquid form, all thoroughly mixed.

The inventor of the process finds a convenient mode of using it to be, to put the fine ore, intimately mingled with fluid asphaltum, upon some wood shavings or paper, in a furnace having a flame chamber, with a bottom having numerous small openings for air currents, and under this a chamber adapted to hold air under pressure, to be forced into the chamber above. Fire being communicated to the shavings or paper, and fine currents of air under pressure being admitted to the flame chamber, the hydro-carbons, mingled with the fine ore, speedily takes fire, in turn setting fire to the sulphur, which is immediately released, and to the gases generated by the act of combustion. The whole mass is expected to burn up with a brisk flame, and the operation of eliminating the sulphur be accomplished in a few moments. The material left after such treatment is in a light, porous condition, something like pumice stone, and is readily crushed and fit for amalgamation.

With fluid asphaltum, one part, by weight, is mixed with nine parts of ore. The process is said to be effective with concentrates, fine dust, high or low-grade sulphurets, ores containing arsenic, tellurium, antimony, etc.

The peculiarity of this process does not consist in mixing the ore with hydro-carbons, for that has been done before; that is, the ore has been mixed with hydro-carbons and smelted. But it consists: "First, in reducing the ore to fine particles; second, in intimately mingling the ore with hydro-carbons; third, in subjecting such particles while under exposure to air drafts, to heat and flame produced entirely by the combustion of the hydro-carbons and the inflammable gases generated in combustion." If supplemental fires are used, it would be another thing. In this, it is hoped to do without all fuel except the hydro-carbons mixed with the ore. The process may be practicable, but the ore is not under control as to management of heat, as in a roasting furnace. With highly sulphureted ore, there would have to be a large quantity of hydro-carbon used to thoroughly desulphurize it.

POCKET MINING.—Pocket mining around Sonora, Tuolumne county, is in the height of excitement. The *Independent* says that around Bald mountain a great deal of fresh ground has been broken, and old locations are being vigorously worked. It says: Three Mexican boys, one formerly a boot-black in Sonora, finding there was nothing in it during the rainy season, left the business to try his luck at mining. They prospected near Nat Arnold's claim in Clark's gulch, above Yankee hill. They found some very rich float rock, but a stream of water on the ground, and after eluding and a short run they cleaned up between \$300 and \$500 in quartz gold, and succeeded in uncovering a fine and promising quartz vein which prospects well. Prepare to hear of another rich strike.

PROPOSED TUNNEL.—We see by the *Placer Herald* that a move is on foot, headed by Wm. Roberts, to run a tunnel north and south through Duncan hill. Such a tunnel would cut through all the many ledges in that hill at the depth of several hundred feet from the surface, and afford cheap and convenient means for working them; and the *Herald* sees no reason why it would not prove a paying enterprise. With such a tunnel and a mill at the mouth of it, there would be lively times in that locality.

STAY AT HOME.—The *Georgetown Gazette* (El Dorado county), which, by the way, is one of our most readable exchanges, paying strict attention as it does to local topics, in speaking of miners leaving here for the new mining districts of the Tombstone, says: "After being well healed, most of them will find their way back to old California, and content themselves in prospecting in this the most encouraging field we know of."

## Hydraulic Mining in Canada.

It seems that they are about to get to work mining for gravel in Canada, and doing it on the hydraulic mining principles. An association has been formed in London to purchase some ground on the Riviere du Loup, in the county of Beauce, Province of Quebec, Canada. The property consists of 1,245 acres, held in fee simple, and of mining rights over about 1,927 acres in addition thereto. Both sides of the Riviere du Loup are included in the property to the extent of two and one-half miles on one bank, and three miles on the opposite bank.

The formation is of conglomerates and talcose slate and sandstone, with numerous small veins of quartz. There are also several large bedded veins of quartz from which samples have been taken, showing fine gold visible in the rocks. An analysis of a sample of this rock gives a result equal to \$300 to the ton. There are enormous deposits of auriferous gravel high up on the banks of the river, and it is proposed to commence operations by washing this gravel by the hydraulic method. Mr. W. J. Smart, M. E., who is spoken of as a "gentleman of great experience in gold mining in California," has made a report on the property, in which he says: "The result of our prospecting on the bed rock in the bed of this river was from 5 cents to \$1.50 to the pan of 25 lbs. of gravel, which should pay very largely if economically and advantageously worked. The banks of the river also prospected well. The main lead being exposed at two different points, one at the upper eastern boundary, and the other at a distance of about three-quarters of a mile below on the same side of the river, with indications of its crossing to the opposite bank of the river at a point below on the property."

"The depth of gravel in this lead will range from 30 to 50 ft., the exact depth being impossible to positively determine without drifting on the bed rock to its lowest point; our prospecting of this lead yielded from 1 to 20 cents to the pan of 25 lbs. of gravel, which would pay you well to sluice largely to hydraulic, which I would recommend as the best way to work it. There is abundant water in the river for all purposes, and sufficient for all to work by either method. The natural advantages are very favorable. You have good timber in abundance in the immediate vicinity, a railroad within 20 miles of the property. The price of a good class of labor at this point is from 80 cents to \$1. per day."

"There are two small streams running into the Du Loup river on the property that I understand from the people here have yielded well, but I did not prospect them to any extent."

Two seasons have been devoted to the exploration and opening up of these deposits, and Mr. A. A. Humphrey, who has conducted this work, estimates that there are 30,000,000 cubic yards of gravel in sight, carrying gold at the rate of 30 cents per cubic yard, equal to \$9,000,000. The cost of washing this gravel will be two and one-half cents per yard, equal to \$750,000—leaving a net profit of \$8,250,000, or \$1.650,000, from this part of the property alone.

In the report on this property by Mr. W. J. Smart, M. E. (Morey, Smart & Co.), a gentleman of great experience in gold mining in California, it is stated they have got 5,000 inches of water, and the prospectus says: "A head of 150 ft. can be obtained for one-twentieth the cost for the same amount of power in California."

It seems the association is to pay \$80,000 in fully paid up shares, and \$15,000 in cash for the property. It is intended to start work at once on the gravel, and afterwards on the quartz. We shall watch this hydraulic mining experiment in Canada with interest, but think they could have got good ground a great deal cheaper out here by buying at first hands.

WASHED THROUGH A FLUME.—Some two weeks ago, during the heavy rain storm and high water, a man by the name of Taylor, who was at work in Col. Moody's claim, at Gold Run, was washed through one of the double flumes under the following circumstances: Mr. Taylor in attempting to place a board across the flume slipped and fell into the water. This flume is double and the sides some 8 ft. high, and was at that time more than half full of water, which was running at a rapid rate. Taylor managed to float himself on the surface of the water and washed through the flume, some 300 ft. long, and over the dump at the end, 8 ft. high. The quantity of water was so great he could not stop himself here but was washed down the canyon about 500 ft. further before the water spread out sufficiently as to stop its force so he could manage to get out. Strange as it may seem Taylor escaped injury with the exception of several bad bruises on different parts of his body.

OLD TAILING PILES.—Last week Mr. Neelon brought into Oroville, Butte Co., a slug which weighed \$67.50. He picked it up on a pile of tailings near Hancock City. The tailings, from which the piece was taken, were the refuse thrown out from mines that had been worked in '49. A large number of men are at present at work washing over all the old tailing piles near that place.

CALIFORNIA DISTRICT, Arizona, has three "companies" operating there, and it has from 800 to 1,000 locations, which are being prepared for sale to the Eastern sharps who are expected with the spring.

## Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening, Vice-President Bebr presiding.

Donations to Museum: From W. A. Lawson, a human skull, supposed to be that of a Washoe Indian found at Reno, Nev.; from Julius G. Grundell, a horse shoe crab; from N. N. Lockington, a specimen *Urolophus torpedinus* (sting-ray); from Mrs. A. E. Bush, of San Jose, specimens of serpentine, talc and marmolites, from Santa Clara county; from Mrs. E. V. Robinson, of Santa Barbara, box of carnelians, agate, etc., from Crescent City, Del Norte county; from Julius G. Grundell, fragment of a geode; from Henry Chapman, specimen of infusorial earth from Hamburg, Germany, used here in making giant powder.

Professor E. T. Cox and L. Oesterrischer were elected resident members of the Academy.

## Alaska.

Among the exchanges and donations to the library, received since the last meeting, was a preliminary report upon the population, industry and resources of Alaska, by Ivan Petroff, special agent of the United States Census of 1880, transmitted to Congress January 13, 1881, by Secretary Schurz. He speaks of Alaska as a Territory without a civil organization, where cereal crops cannot be grown, and treats of its spruce forests, fur trade and fisheries, or other natural resources; also of the Ingalix, or people of the great interior, or large extent of country situated away from the coast.

The Russian Church claims as on its registers 10,950 Greek Christians, from among a total population divided as follows: Whites, 392; Creoles, 1,683; Aleuts, 2,214; Innuits, 17,488; Indians, 8,401; making a total of 30,178 souls as the entire population of Alaska, enumerated for the recent census.

The past year there were caught 100,000 seals, 5,700 sea-otters, 10,000 martens, 8,000 foxes, 1,000 bears, 4,000 beavers, and 20,000 mink. Also, from the neighborhood of Shumagin Islands, 600,000 codfish and 2,000 hls. salmon.

## Currents at Behrings Strait.

Among other documents received was an abstract of a report to C. P. Patterson, Superintendent U. S. Coast and Geodetic Survey, by W. H. Dall, Assistant in charge of the schooner *Yukon*, employed last summer on the coast of Alaska, with a diagram of Behring Strait and hydro-thermal sections, showing its surface, temperatures and depths. The general conclusions reached from these, with previous and subsequent observations in the strait, was as follows: The water is warmest toward the American side. The highest temperature is 48° F., and the lowest about 36° F. The uniform succession of the vertical curves, representing degrees of temperature, are generally very regular, but sometimes interfered with by an eddy around the diomed islands, rising abruptly as granite domes, with bold perpendicular sides, wholly without any beaches, in the middle of Behring Strait. The uniformity of the temperatures from top to bottom, does away with the idea of any sub-surface current from the Arctic Ocean, carrying cold water southward. His current observations showed another conclusion to be probable, although a more thorough investigation will be required to place it beyond question, namely, that the northerly current, through the straight and along the Arctic Ocean, is chiefly dependent on the tide for its force and direction and on the warming of the shallow waters of Norton Sound and the Yukon and vicinity for its high temperature, which is greater than any of the Behring sea water south of St. Lawrence island. This would agree with observations of explorers along the Siberian coast and elsewhere, where large bodies of comparatively warm water derived from large rivers are poured out over shallow areas of a cold sea-basin.

The direction of the current in Behring Strait, when the *Yukon* was lying near the Diomedes, was reversed by the tide, and the vessel tailed in opposite directions during flood and ebb. The rate varied with the strength of the tide, and during their stay did not exceed three knots. The directions agreed with the trend of the land on either side of Cape Prince of Wales, along which the tide runs, and where it would naturally gather its greatest velocity, and, as a consequence, diagonally cross the strait.

On the reading of these notes a discussion ensued concerning the probable position of the *Jeannette* and the influence of Arctic currents on her progress. This gradually led the discussion with the question of the change of climate in the Arctic, and the reason why the remains of tropically reared animals were found in those northern regions.

It was stated that a letter had been received by one of the members from Mrs. De Long, in which she expressed to the Academy her acknowledgements and thanks for their kind interest manifested toward her husband, both before his departure and, as shown at their recent proceedings, inquiring into the probable present position of the *Jeannette* and missing whalers. She said the opinion arrived at in the proceedings of this academy more nearly coincided with her own preconceived opinion than any she had yet seen. She feels confident that he wintered the first winter as far north as he was able to go, on the east coast of Wrangel Land.

Professor Davidson gave notice that at the next meeting he would read a paper prepared by Ivan Petroff, on the "Internal Water Communication in Alaska."



## Legislative.

The Legislature, though it has not many days more to exist, is doing its work slowly, and a great deal will be left undone that should have been attended to. The debris and appropriation bills are, of course, the most important to be considered.

Enos' bill, providing that all public work be done by day labor, was referred to the Committee on Labor and Capital. It was reported favorably by this committee, and was passed in the Assembly.

Senate bill, No. 36, relative to mining corporations, and which we have before given, was reported for rejection.

Assembly bill, No. 163, to transfer the cabinet of minerals in the State library, and all the instruments belonging to the Geological Survey at the University, not needed by the University, to the State Mineralogist, was finally passed.

Mr. Mason introduced a concurrent resolution asking for an appropriation of \$20,000 from the Federal Congress to remove obstructions to navigation at the mouth of Smith river, in Del Norte county.

Assembly bill, No. 431, by Whipple, gives \$5,000 to provide for a proper representation of the products of California at the next World's Exhibition, to be held in New York in 1883. The commissioners receive no pay.

Assembly concurrent resolution, No. 23, by Mr. Murphy, is as follows: Whereas, from various causes, natural and otherwise, the Sacramento river, the harbor of Vallejo, the bay of San Francisco, is becoming fast filled up and shoaled by debris and detritus, thus not only endangering the harbor of San Francisco, the navigation of the Sacramento, but also the Navy Yard at Mare Island; therefore, be it

Resolved by the Assembly, the Senate concurring, That our Senators in Congress be instructed, and our Representatives requested, to use all honorable means to secure an immediate appropriation of at least \$500,000, to be expended under the direction of engineers appointed by the President of the United States, to secure our rivers and harbors against this threatened danger.

Resolved, That the Governor be requested to immediately transmit a copy of these resolutions to each of our Senators and Representatives in Congress.

Mr. Chase has introduced a bill to permit the voters of every county, city, town or township, in this State, to vote on, and thereby to determine the question of granting license to sell intoxicating liquors within its limits.

Mr. Baker, of Sacramento, by consent, introduced a bill to amend Section 25 of an act to promote drainage. The bill provides that the money derived from the State tax shall be used only on cuts and outlets of rivers. Referred to Committee on Water Rights and Drainage.

The Committee on Labor and Capital have reported back Senate bill, No. 5, for the establishment and maintenance of a Bureau of Labor and Land Statistics, recommending that it do pass; A. B. 492, to establish a Bureau of Labor Statistics, without recommendation; S. B. 21, to regulate the hours of labor on work for the State, recommending that it do not pass.

Mr. Griffith moved a reconsideration of the vote by which A. B. 202, to establish a State Hospital and Asylum for Miners, was passed yesterday, and stated his objections to the passage of the bill, saying that it was vague and ambiguous in its character. Mr. Lewis liked the ideas in the bill, and hoped it would not be reconsidered. Mr. Hoitt moved to lay the motion to reconsider on the table. Carried.

Mr. Yung introduced a bill to prevent the filling of the streams, rivers and bays in California with the tailings and debris from hydraulic mines. The bill provides that every person, as well as every person who in behalf of any other person, or as the agent or employee of any person or corporation, who runs or deposits, or who procures or suffers to be run or deposited into the bed or channel of any river in this State, or any branch thereof, any of the tailings or debris from any mine in this State, worked by what is known as the hydraulic process, is hereby declared guilty of a felony, and upon conviction shall be confined in the State prison for a period of time not exceeding ten years; provided nothing in this act shall be construed to prohibit the owners of such mines from acquiring gulches and flats, or either thereof, adjacent to any of such rivers or streams, or at any other convenient or suitable places, and therein depositing such tailings and debris; provided, further, that by means of dams, or other obstructions, they confine such tailings and debris therein, and do not suffer or allow the same, or any part thereof, to run, to be carried into or eventually flow into any such river channels or their

branches, or into any bay or harbor of this State; and provided, further, that every person or corporation injured in any manner by the flow of any such tailings or debris from any such mines, may maintain an action jointly or severally, for all such damages sustained by any or all of them, and when the question is one of common or general interest of many persons, or when the parties are numerous and it is impracticable to bring them all before the court, one or more may sue or defend for the benefit of all. And in such action all persons or corporations, or either thereof, contributing to such damage complained of, may be joined as defendants, and all such persons or corporations who shall suffer or allow any such tailings or debris to escape into any such river channels or the tributaries thereof shall be deemed to have contributed to such damage complained of, and upon a recovery being had, the plaintiff shall be entitled to a judgment for triple damages.

The bill was read for information of the House, and after debate was finally referred to the Committee of Irrigation.

Senator Wm. Johnston, of Sacramento, has introduced a bill authorizing the Board of State Capitol Commissioners to set aside not less than 400 ft. squares of land in the State Capitol grounds, east of the State Capitol building, for the erection of a Sutter Memorial and Industrial Exhibition building in honor of the late Gen. John A. Sutter. The California Pioneers and Territorial Pioneers of California, and the State Board of Agriculture, are authorized to erect the said building on the land set aside. The

## Trouble in Eureka District.

There has been for some time a dispute between the Albion and the Richmond mining companies, at Eureka, Nevada, about the boundaries of the respective claims, but more particularly about a certain ore body. For the past two weeks the companies have been annoying each other in many ways, using cayenne pepper, smoking each other out, etc. A dispatch sent from Eureka on the 20th, says: A fire was discovered in the south chamber, No. 13, of the Richmond mine on Thursday, which was only extinguished after considerable trouble. Attempts were made to create this impression that the fire was incendiary, and was occasioned because of the difficulties with the Albion. While the question was being discussed yesterday came the report of the Albion's narrow escape from entire destruction and the news of the injury to several miners by an explosion. Excitement and indignation are rife, but among the many reports circulated the following are alleged to be the facts: For the past week the Albion people, to protect their ground, have resorted to the smoking-out process—the draft being through the Richmond, both mines being connected by drifts. The Richmond people not being able to endure the smoke drifted under the Albion ground. At 2 a. m. Saturday there were fired off four boxes of giant powder of 50 lbs. each, and two kegs of black powder

## Fungi Injurious to Grain.

One of the most interesting studies for the microscope is found in the life history of the fungi injurious to growing grain. There are several of these known under the different names, "rust," "mildew" and "smut." There are also several kinds of smut, one appearing upon what are styled the grasses as distinguished from the cereal grains, another infesting the ears of Indian corn. And there is still another, the smut of wheat, *Tilletia caries*, the full life history of which is illustrated in Figs. 1 and 2. The two engravings cover parts of the same ground, but each has points which lead to their use in this connection. The appearance of a smutty head of wheat may be seen at Fig. 3. The center of attack is the floral organ of the plant, and aside from the repelling characteristics of this fungus itself, it produces a sorry and disheveled appearance of the wheat head. The spores of the smut fungus are sown with the grain. This fact is shown by the good results which attend soaking the seed grain in a solution of bluestone. This substance is fatal to the life of fungus spores, and by its use seed grain is measurably freed from the parasite. Such spores as escape with their lives, or are introduced to the wheat field from outside sources, gain access to the plant, and proceed to multiply rapidly. After attaining a growth inside the young grain, and giving it a swollen and distorted appearance, they burst through the epidermis, and send forth myriads of black dust or spores, which cover the grain head, and attach themselves to everything which touches it. The grain of wheat from a smut-stricken head appears at a natural size. The cutting open of the grain shows the interior to be fully possessed by the fungus; *b* in Fig. 1, and *b* in Fig. 2 show the section of a smutty kernel; the latter so much magnified that some traces of the fungoid growth are shown. The black dust, if highly magnified, is seen to be composed of globular bodies with a covering marked off into hexagonal divisions. This appearance is still plainer at *d*, where the true diameter is magnified 1,000 times. The smut fungus has an obscure mycelium; that is, its thread-like parts, which, somewhat compared to the roots of higher plants, are not so abundant as in other fungi, as for example, in the "rust" fungus shown above. This mycelium is not furnished with suckers as are mycelia of some other fungi. For these reasons, perhaps, the smut fungus does not spread through the plant, but is apparently satisfied to remain in the head, as though it knew it had the best part of the structure, and there it devoted its energy to the production of the dust, or spore masses.

In this reproduction of its kind, the smut is also peculiar. The spores spring directly from the mycelium, with no intervention of sexual organs as are detected in other order of fungi. The steps in the reproduction are shown in the engravings. In describing these steps, we shall draw mainly upon the writings of M. C. Cooke and of Prof. Farlow, the well-known mycologist, of the Bussey Institute. After a short period of rest, the spore throws out a germinal tube (Fig. 3, *d*). This is short, and is crowned at the top by a whorl of cells, which unite with one another in pairs by a cross-partition, thus forming a sort of conjugation (Fig. 3, *f*). After this lateral union has taken place, certain of the cells begin to elongate, as shown in the engraving, above the point of contact. The reproduction is continued. The elongations, or sporules, as they are called, are shown in still larger form at Fig. 2, *g*. These forms are also known as secondary spores. Soon they give out a third form, the club-shaped body shown in Fig. 2, *h*, which is called a tertiary spore. The tertiary spores have another generation of their own kind, shown at Fig. 2. Thus the foe of the wheat grower, known as smut, proceeds in its evil way.

New Mexico.—Very rich silver specimens are brought from the Florida and Black Range mountains, and the Los Vegas Mining World says, the general impression prevails among old miners that the Chihuahua of New Mexico will be found in these new districts, which have been held by the Apache Indians until recently. The small bands of hostiles that still exist in the southern part of the Territory will soon be exterminated and the entire Territory will be open to progress.

True.—The best paper a miner can subscribe for is the MINING AND SCIENTIFIC PRESS. It will keep you posted in the mining news of the Pacific States and Territories. It will enlighten you upon the improvements in machinery and working of ores.—*Georgetown Gazette*.

The members of the Union, desirous of protecting their own lives, held a meeting and discussed the situation. It was finally decided to adopt the suggestion of one of the contending parties and put men enough in each mine to prevent either company from encroaching on the other, until the difficulty is settled by the courts.

The British Columbia authorities offer a bonus for a woolen mill to be erected in that province.



FIG. 1—TILLETIA CARIES.

building may be occupied jointly by the State Board of Agriculture, for the State exhibitions of the industries and industrial products of the State, and by the California and Territorial Pioneers, for the safe keeping and preservation of relics of the early history of California. The form and plan of said building shall be submitted to and approved by the State Board of Capitol Commissioners, and when erected shall be deemed the property of the State.

TANITE.—The Tanite company of Stroudsburg, Monroe Co., Pennsylvania, have carried on the manufacture of their peculiar product to such perfection that emery wheels and emery grinding machinery is now found in use all over the country. It is so much in demand that in addition to the usual agencies they keep large stocks at various central points, as will be seen by card in another column. There are five classes of wheels, each adapted for a special purpose. In addition to the wheels they manufacture various grinding tools or machines for various purposes, specially adapted to the class of work they are to do. Among others is their saw gummer, which is in extensive use. They make special sizes of wheels with round, flat or beveled faces. Newman's emery planer, which this company make, has taken a cut one-sixteenth of an inch over a surface of 100 square inches in six minutes and nine seconds. They have a car-box grinder, shaper and sharpener, table grinder and surfacing machine, emery grinders of various sizes, etc., etc. The company now does a very large business in manufacturing its special class of goods, which have an enviable reputation at home and abroad.

ANTIMONY is quoted in Liverpool at £62 to £64 per ton for French star regulus.



FIG. 2—THE SAME STILL MORE ENLARGED.



## A Chloride Camp.

## Taylor District.

Taylor district, situated about 12 miles in an easterly direction from Ward, has been attracting no little attention within the past few months. The ores shipped from it by the new locators of late have invariably given good returns. That the district has not attracted attention before is what puzzles not a few. Having heard so much about Taylor district lately, we accepted an invitation from George C. Hamilton and visited the district Sunday last. After examining the Monitor, owned by McGill, Briggs & Lyons, the Sunrise, owned by Carothers & Garaghan, and the Self-Cocker, owned by the last named parties, it was not difficult to arrive at the conclusion that Taylor had been overlooked by the first locators. The mineral belt is fully three miles long by a mile wide. In the Monitor there is more ore in sight of a grade that will pay to mill than can be found anywhere in the State so near the surface. Much of the ore is high grade, in proof of which we have but to cite the fact that several years ago between 8 and 10 tons of ore were shipped to San Francisco, and, after paying all expenses, a profit of \$2,200 was left. The owners are at present engaged in running an open cut lower down on the east side of the ravine, a short distance from a cut that has penetrated the ore about 15 ft. The old cut is entirely in ore, all of which will pay to mill, and a portion will go as high as \$400. Mr. Lyons, one of the owners, who showed us all there was to see, is free to admit that he was never interested in a better prospect than they have in the Monitor.

We next visited the Sunrise, which is being opened in two places—in one place by tribute work and in the middle of the claim by men in the employ of the owners. In both openings the prospects are not only good, but very good. In the opening in the middle of the claim, where the work is being done by the owners, a number of sacks of ore that will pay to ship were on the dump. From our standpoint it appeared that they had only commenced getting into the ore, which is rich beyond question. This particular spot is claimed by the knowing ones to be the richest along the mineral belt. On the same claim, a short distance from the southern end, James Hixon and Charles Peck are doing tribute work. If they were playing the end against the middle, they might lose, but we don't think they will. After going through a limestone cap of eight or nine ft., they have cut a body of ore that promises to widen out. They have fully as good prospects as any in the district.

We next visited the Self-Cocker mine, also owned by Carothers & Garaghan. James McComie and John Murphy are doing tribute work on this claim, and have out about eight tons of first-class ore that will go from \$500 to \$600, and about 30 tons of second-class ore that will go from \$100 to \$150. Some of the first-class ore goes as high as \$2,000. They are making no effort to develop the mine further than following the ore and taking out all that is in sight. Wherever they find the cap rock cropping out, which is a mixture of quartzite and lime, they are sure to find ore by cutting through it. Many an old prospector can learn something about prospecting by visiting the district. His first remark would be: "I have walked over just such looking stuff as that for the last 20 years." Taylor promises to be the best chloride camp in the State if nothing else. —Ward Relex.

**COPPER ORES.**—The furnace at the Ludwig copper mine, Mason valley, will be ready to start up in a day or two. There are 3,000 tons of ore already extracted and on the dump awaiting reduction. The furnace will be capable of reducing 30 tons of ore per 24 hours. The company have sunk a well and have any amount of water. The work of fitting up the furnace and superintending affairs generally is being done by Chris. James, of Gold Hill. —Gold Hill News.

## Business Directory.

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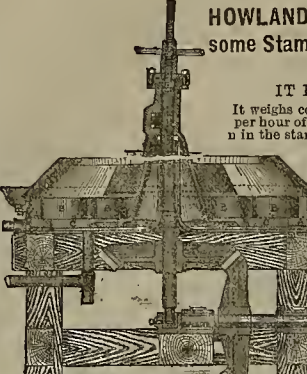
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It weighs complete, 7,000 pounds. It costs \$1,500 ready for the belt. Will crush one per hour of hard quartz that will pass through a 40-mesh screen. The wear is less in the stamp mill. Its wearing parts are plain castings and can be dropped into position in a few moments, as shown by the letters A, B and C, no bolts or keys are required; it can be set upon the floor of a mill with no expense for foundations, and can be used to crush and work in charges or continuous. It will amalgamate either gold or silver ores, making a simple, cheap and effective mill, it requires twelve-horse power.

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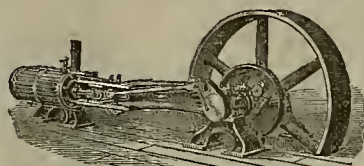
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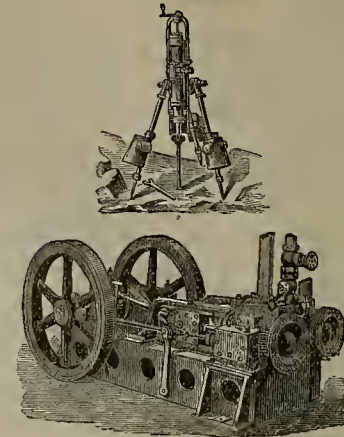


## California Inventors

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PATENTS AND INVENTIONS.

List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.]

- FOR WEEK ENDING FEBRUARY 1ST, 1881.
- 227,171.—TAP AND FAUCET.—E. H. Crow, S. F.
- 227,093.—FRUIT DRIER.—Charles Dickinson, Portland, Oregon.
- 227,179.—PLOW.—C. Gratten, Stockton, Cal.
- 227,238.—GRINDING MILL.—Geo. Johnson, Sacramento, Cal.
- FOR WEEK ENDING FEBRUARY 8TH, 1880.
- 227,358.—BOX.—G. P. Adams and J. Miller, S. F.
- 9,556.—LAMP.—reissue.—E. Boesch, S. F.
- 227,324.—SEPARATING FIBER.—E. A. Leigh, S. F.
- 227,665.—HORSE-HOLDING ATTACHMENT.—R. E. Shannon, S. F.
- 337,645.—STOCK INDICATOR.—J. C. Uhler, S. F.
- NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**HORSE-HOLDING ATTACHMENT FOR VEHICLES.** Roht E. Shannon, S. F. This invention particularly appertains to that class of horse-checking devices operated by gear wheels attached to the hub of the vehicle. The usual running gear of a vehicle is employed. Under this body and running its length between the axles is a shaft terminating in its rear end in a bevel-pinion which meshes with another bevel-pinion on a rod. The rod is fastened in appropriate braces, which permit of its turning to the rear axle. Its outer end is provided with a bevel-pinion which meshes with cogs on the inner side of the hub of the wheel. When the vehicle stops the lines are thrown into a slot in the top of the upright standard. The stirrup is pressed forward, which action pushes the rear hoxing sufficiently to throw the bevel-pinion and cogs upon the wheel in gear. If the horse moves forward, the rod turns, which turns the shaft, pushing the feathers or ratchets in the shaft into operation with a loosely running gear wheel, thereby winding up the line and checking the horse.

**SIDE-HILL HEADER WAGON.**—W. Taynton & W. J. Derickson, Clayton, Cal. This header wagon consists in certain connections and attachments by which they are adapted for use on side-hills, and are so arranged by means of peculiarly constructed gearing under the head of the wagon, and operating on curved holsters, that the head of the wagon may always be kept on a level without reference to the angle which the wheels may take on side-hills, the center of gravity being always kept in such a position as to prevent danger of overturning, even with top-heavy loads.

**WINDMILL.**—E. Foskett, San Jose, Cal. This windmill consists in the employment of a vertically oscillating beam, which is balanced upon the upper end of a vertical rotating post or standard, and is provided at one end with a rudder which holds it in line with the wind, while the other end supports a frame containing a series of vanes. In combination with this apparatus is a novel device by which the vanes have their angle changed at the end of each stroke, so as to produce a return stroke, and a regulating device by which the angle of the vanes may be adjusted to suit the strength of the wind.

**DRAW BAR FOR CARS.**—A. H. Weir, Los Angeles, Cal. This invention relates to certain improvements in railroad-car draw-heads and couplers, and it consists in a novel construction of the fastenings whereby the draw-head is secured to the car. To fasten this draw-head to the cars the stem is provided with a key on each side, beveled so that a wrought-iron clasp driven over them will hold them tight to the stem, and a small bolt runs transversely through the stem and keeps the hand in place.

**GRINDING PAN.**—Steiger & Kerr, S. F. This invention relates to certain improvements in the reduction of ores, and in the apparatus employed for that purpose; and it consists in the combination with what is known as the "Miller," or "Hepburn" pan, of a screen or screens, which are fitted into the side of the pan and provided with controlling gates, so that the pan may be operated continuously, as may be desired.

**GUN FOR KILLING VERMIN.**—J. S. Woolsey, Gilroy, Cal. The tube or barrel of this gun is provided with a leg whereby the gun is set upright in the ground at the mouth of the squirrel hole. When the gun is placed at the entrance of a hole, the animal, in coming toward it, will cause the gun to be discharged by touching a rod which is connected with the trigger.

The Sierra Madre Villa.

The accompanying engraving, although made from recent photographs, but meagerly represents the natural view of probably the most celebrated "winter home" in southern California. It is no doubt justly entitled to the good reputation given to it as the most desirable villa residence known by many of its European and Eastern visitors—some of whom have wandered around the world in search of the most pleasant and recuperative climate.

At times the guests are so numerous at the villa that at present the proprietor, Mr. W. P. Rhoades, is troubled to find room for all who are urgent for accommodations. On the register here are to be found prominent representatives from the leading cities of the Union and many foreign countries.

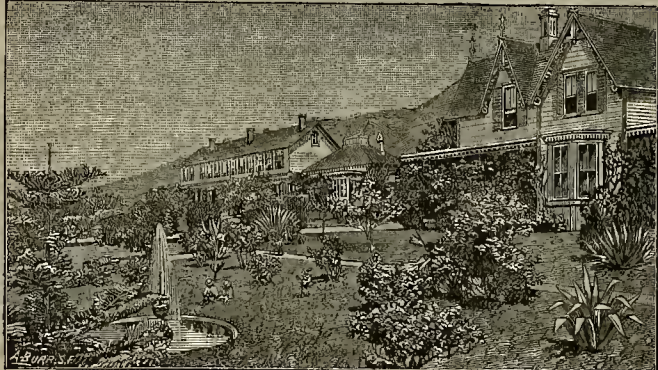
It is situated on the "mesa" (table land) adjoining the Sierra Madre mountains, 13 miles from Los Angeles and 10 from the railroad station near the old Mission at San Gabriel. This mesa is in the warm or thermal belt, at an altitude of 1,800 ft. Havana tobacco plants are still growing here untouched by frost, and tomatoes are continually ripening for the table in the open air. The honey bee, true to its instinct, "improves each shining hour," even in mid-winter, by gathering a part of its living from the bloom of trees, shrubs and occasional wild flowers.

Surrounding the villa and along its pleasant walk are a variety of ornamental plants and trees. Its large orange, lemon and lime orchard annually produces the finest and earliest fruit in Los Angeles county. A large apiary, a vineyard and an orchard of common fruits and nuts belong to the homestead.

The principal rooms of the villa are of good size, lighted by gas and well arranged for the comfort of guests. The wide piazza extends along the whole front of the parlor, music and billiard room and the main building villa. Being enclosed with a glass front it furnishes a good promenade, with a magnificent view extending over San Gabriel valley, Pasadena and gradually sloping plains (extending some 30 miles or more to the ocean beach at Santa Monica), Wilmington harbor and beyond to Catalina island, distant in this act, a return to that effect shall be made upon the invoice, and articles so noted shall not be permitted to pass the custom-house or be delivered to the consignees, unless on re-examination, as provided for in this act, it shall be found that the said articles are not adulterated.

SEC. 4. The owner or consignee shall have the privileges of calling, at his own expense, for a re-examination, and on depositing with this collector of customs such sum as he may deem sufficient to defray such expenses, it shall be the duty of this collector of customs to procure a certificate, under oath from a public analyst, of a careful analysis of the articles in question; and in case the report by certificates of the analyst shall declare the report of the officer who examined the goods to be erroneous, and the said articles to be unadulterated, the said articles shall be returned to the owner or consignee, and passed without reservation on payment of the duties, if any. But in case the officer's return shall be sustained by the analyst, the said articles shall remain in charge of the collector of customs, to be disposed of in accordance with regulations to be prepared by the National Board of Health and approved by the Secretary of the Treasury: *Provided*, That the owner or consignee, on payment of charges of storage and other expenses necessarily incurred by the United States, and on giving bond, with sureties satisfactory to this collector, agreeing to remove said articles from the United States, shall have the privilege of re-exporting them at any time within the period of six months after this date of the report of the inspector or public analyst.

SEC. 5. In order to carry into effect the provisions of this act, the Secretary of the Treasury is hereby authorized to appoint from names submitted to him for that purpose by the National Board of Health one or more suitably qualified persons as special inspectors and as public an-



A WINTERING PLACE IN SOUTHERN CALIFORNIA.

all between 50 and 60 miles. All this and many intervening hills and distant mountain ranges are to be viewed in varying lights, shades and grandeur.

The place was purchased by Mr. W. Cogswell, the artist, of San Francisco, and laid out and planted by him with the choicest of trees and shrubs at a total expense of about \$75,000, for a private villa, six years ago. To Eastern visitors the growth of the place appears almost miraculous for so short a period. A fountain and large stone reservoir, supplied with pure mountain water, is a rare benefit and attraction to the place.

A beautiful drive is had from Los Angeles city through East Los Angeles, between the rolling hills, along the Arroyo Seco to Pasadena, through the thriving town and colony settlement and over the sloping table land to the hotel. Many pleasure parties visit the villa in this way enjoy a good view of the country and return the same day by way of the Old San Gabriel Mission and Alhambra settlement. No tourist does southern California or himself justice without visiting the Sierra Madre villa.

**Adulteration of Food or Drugs.**

In the last issue of the PRESS, in an article on the above subject, we proposed to give in full the bill on this subject presented to Congress by the National Board of Trade. The bill is as follows:

*Be it enacted*, That no person or corporation shall knowingly transport, or cause to be transported, from the State, district, or Territory in which he resides or does business, into any other State or Territory, or from any foreign country, or other State or Territory, into the State or Territory in which he resides or does business, for sale or barter, or to be offered for sale or barter, any article of food or drugs adulterated within the meaning of this act, and any person violating the above provision shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not more than \$50 for each offense.

SEC. 2. That no person shall, within the District of Columbia or any of the Territories, or in any fort, arsenal, dock-yard, or reservation, or other place under the jurisdiction of the United States, manufacture, offer for sale, or sell any article of food or drugs which is adulterated within the meaning of this act, and any person violating this provision, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine not exceeding \$50.

SEC. 3. If, on examination of any food or drugs imported from any foreign country, it is found to be adulterated within the meaning of

alysts for adulterated food and drugs at such ports of entry as the Secretary of the Treasury may deem expedient, and it shall be the duty of the National Board of Health to prepare instructions governing the work of such inspectors and analysts, which, when approved by the Secretary of the Treasury, shall govern their action, and that of collectors of customs, in preventing importation from foreign countries of food or drugs adulterated within the meaning of this act.

SEC. 6. The National Board of Health shall make, or cause to be made, examination of specimens of food and drugs collected under its direction in various parts of the country, and shall publish in its weekly bulletin the results of such analyses. If it shall appear from such examination that any of the provisions of this act have been violated, the Secretary of the Board shall at once report the facts to the proper United States District Attorney, with a copy of the results of the analyses duly authenticated by the analyst under oath.

SEC. 7. It shall be the duty of every district attorney to whom the Secretary of the National Board of Health, or any collector of customs, shall report any violation of this act, to cause proper proceedings to be commenced and prosecuted without delay for the fines and penalties in such case provided, unless, upon inquiry and examination, he shall decide that such proceedings cannot probably be sustained, in which case he shall report the facts to the National Board of Health. And for the expenses incurred and services rendered in all such cases, the District Attorney shall receive and be paid from the Treasury such sum as the Secretary of the Treasury shall deem just and reasonable, upon the certificate of the judge before whom such cases are tried or disposed.

SEC. 8. An article shall be deemed to be adulterated within the meaning of this act—

A.—IN THE CASE OF DRUGS.

1. If, when sold under or by a name recognized in the United States Pharmacopoeia, it differs from the standard of strength, quality or purity laid down therein.

2. If when sold under or by a name not recognized in the United States Pharmacopoeia, but which is found in some other pharmacopoeia or standard work on Materia Medica, it differs materially from the standard of strength, quality or purity laid down in such work.

3. If its strength or purity fall below the professed standard under which it is sold.

B.—IN THE CASE OF FOOD OR DRINK.

1. If any substance or substance has or have

been mixed with it so as to reduce or lower or injuriously affect its quality or strength.

2. If any inferior or cheaper substances or substances have been substituted wholly or in part for the article.

3. If any valuable constituent of the articles has been wholly or in part abstracted.

4. If it be an imitation of or be sold under the name of another article.

5. If it consist wholly or in part of a diseased or decomposed, or putrid or rotten, animal or vegetable substance, whether manufactured or not, or in the case of milk, if it is the produce of a diseased animal.

6. If it be colored or coated, or polished or powdered, whereby damage is concealed, or it is made to appear better than it really is, or of greater value.

7. If it contains any added poisonous ingredient, or any ingredient which may render such article injurious to the health of a person consuming it: *Provided*, That the National Board of Health may, with the approval of the Secretary or the Treasury, from time to time declare certain articles or preparations to be exempt from the provisions of this act: *And provided further*, That the provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food, provided that the same are not injurious to health and that the articles are distinctly labelled as a mixture, stating the components of the mixture.

SEC. 9. It shall be the duty of the National Board of Health to prepare and publish from time to time, lists of the articles, mixtures or compounds declared to be exempt from the provisions of this act in accordance with the preceding section. The National Board of Health shall also from time to time fix the limits of variability permissible in any article or compound.

SEC. 10. The term "food" as used in this act shall include every article used for food or drink by man.

The term "drug" as used in this act shall include all medicines for internal or external use.

SEC. 11. All the regulations and declarations of the National Board of Health, made under this act from time to time and promulgated, shall be printed in the Statutes-at-Large.

SEC. 12. This act shall take effect ninety days after it shall have become a law.

News in Brief.

FOUR HUNDRED molders are on a strike at Cincinnati.

THE fire in the coal mine at Nanaimo, B. C., is entirely extinguished.

FRENCH subjects are being murdered in Algeria by marauding tribes.

EMIGRANT rates from Hamburg to New York have been reduced to \$20.

THE Czar is distributing money in the famine-stricken districts of Russia.

THE Western Union Telegraph Co. has increased its capital stock to \$80,000,000.

AT Havre, France, a large quantity of cartridges intended for export have been seized.

THERE are double the number of married men employed on the Comstock than single ones.

FIFTEEN collieries in South Yorkshire, England, and 12,000 men are idle. Great distress exists.

THREE THOUSAND white men will be wanted in British Columbia the coming season for railroad work.

FOR the nine months ending January 31st, the dairy products of the country amounted to \$21,000,000.

WHEELER, who strangled his sister-in-law at San Francisco, was sentenced to be hanged on April 19th.

THE period of suspension of Capt. Bradley, of the ferry boat, *Bay City*, which collided with the *Oakland* recently, is 60 days.

THE total cost of shipping, transporting and erecting the obelisk presented by the Khedive to the city of New York was \$103,732.

THE Oakland Guards have found it impossible to raise the necessary funds to carry them to Washington, and the subscriptions will be returned.

SIX THOUSAND colliers in Wiguna district, England, have resumed work. Many resumed work in Hinley district. The military and police protect the workers.

T. P. EARNEST, a heavy live stock dealer of Colorado, says that nearly twenty per cent of the cattle of the State perished during the severe weather of the present winter.

IT is now learned that the Peruvian capital was captured by the Chileans through the treachery of Peruvian officers, who encouraged the soldiers to pillage and murder.

IN the Greek Chamber of Deputies Saturday, royal decrees were submitted calling to arms all the men above 21 years of age who have served three months or more in the army.

A TELEGRAM has reached this city that Lyman Hall, first assistant engineer of the steamer *Alec Duncan*, was drowned at Moro bay on Sunday. No particulars have been received.

AT Santa Ana, a party of engineers are reported to be making surveys at the coal fields recently purchased by the Southern Pacific Railroad company, preparatory to sinking shafts.

A DISPATCH from Chihuahua (Mexico) says the Indians are again on the war-path. A band of 200 attacked a settlement near Carrillos recently, killing several women and children and plundering the place.



The Californian.

THE RISING MONTHLY OF THE DAY. YEARLY SUBSCRIPTION \$4. Single number 35 cents. AGENTS WANTED in every town and village of the United States to canvass for this popular magazine. The most liberal commissions will be paid to responsible parties. This is a chance to make money at your own home. Address THE CALIFORNIA PUBLISHING CO. (P. O. Box 2310) 202 Sansome St. S. F.

Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), he sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omission of agents.

Various Causes—

Advancing years, care, sickness, disappointment, and hereditary predisposition—all operate to turn the hair gray, and either of them incline it to shed prematurely. Ayer's Hair Vigor will restore faded or gray, light or red hair to a rich brown or deep black, as may be desired. It softens and cleanses the scalp, giving it a healthy action. It removes and cures dandruff and humors. By its use falling hair is checked, and a new growth will be produced in all cases where the follicles are not destroyed or the glands decayed. Its effects are beautifully shown on brashy, weak, or sickly hair, on which a few applications will produce the gloss and freshness of youth. Harmless and sure in its operation, it is incomparable as a dressing, and is especially valued for the soft luster and richness of tone it imparts. It contains neither oil nor dye, and will not soil or color white cambric; yet it lasts long on the hair, and keeps it fresh and vigorous.

FOR SALE BY ALL DEALERS.

A SCIENTIFIC OPTICIAN.—In 1863, C. Muller commenced the sale of glasses of all kinds in this city, and has continued in the business ever since. Mr. Muller has made the study of the human eye the study of his lifetime. He has, for years, read and experimented, until to-day he stands at the head of all opticians in this country, and his fame extends not only over this coast, but over the far East, and throughout the world. He has studied the eye in all its varying phases, until it is no longer necessary to consult a physician, who, perhaps, has but given this important organ of the human body but a cursory examination, for Mr. Muller has made it the business of his life to study its peculiarities and idiosyncrasies, and he is by nature and by thought thoroughly prepared to almost give sight to the blind. His establishment at No. 138 Montgomery street, is a curiosity in itself, for his stock is large and worthy an examination, and the passer-by on Montgomery street who sees Lord Dundreary staring from the window will be sure to stop at C. Muller's, the leading optician of the coast.—S. F. Journal of Commerce.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

WORTHY OF SUPPORT.—The Scientific Press, Dewey & Co., publishers, 202 Sansome street, San Francisco, is the leading representative journal of the mining interests of the Pacific Coast, and should be encouraged by all who desire to promote home industry. The terms are \$4 a year, within reach of all. Send in your names for the new year.—Mountain Messenger, Sierra county.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and either binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

THE State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

Metals.

(WHOLESALE.)

WEDNESDAY M., Feb. 23, 1881.

<b>IRON.</b>	
American Pig, soft, ton.....	30 00 @ 33 00
Scotch Pig, ton.....	25 00 @ 26 00
American White Pig, ton.....	27 00 @ 28 00
Oregon Pig, ton.....	— @ —
Refined Bar.....	41 @ 8
Home Shoes, keg.....	7 00 @ 8 00
Nail Rod.....	— @ —
Norway, according to thickness.....	8 1/2 @ 9 1/2
<b>STEEL.</b>	
English Cast, lb.....	16 @ 18
Black Diamond, ordinary sizes.....	13 @ 15
Drill.....	9 @ 10
Flat Bar.....	— @ —
Flaw Steel.....	9 @ 10
<b>COPPER.</b>	
Ingot.....	— @ 52
Sheet.....	— @ 20
Sheathing, Tinned 14x18.....	— @ 42
Nails.....	— @ —
Bells.....	38 @ 42
Old.....	— @ —
Bar.....	— @ 22
Precipitate, 100 lbs.....	18 @ 25
<b>LEAD.</b>	
Pig.....	4 1/2 @ 5
Bar.....	— @ 6
Pipe.....	— @ 8
Pipe, Sheet.....	— @ 9
Shot, Discarded, 1/2 on 500 Bags.....	— @ 2 10
Drop, per bag.....	— @ 2 30
Chilled " ".....	— @ 2 50
<b>TIN PLATES.</b>	
10x14 O Charcoal.....	— @ 10 50
10x14 O Coke.....	10 00 @ 10 00
Banco Tin.....	— @ 25 00
Australian.....	— @ 20 00
I. C. Charcoal, Roofing 14x20.....	20 25 @ 21 00
<b>ZINC.</b>	
By the Cask.....	— @ 10
Zinc, Sheet 7x3 ft. 7 to 10 lb, less than cask.....	10 1/2 @ 11
Nails.....	— @ —
Assorted sizes.....	4 00 @ 4 75

Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending Feb. 22, 1881.

HIGHEST AND LOWEST BAROMETER.

Feb. 16	Feb. 17	Feb. 18	Feb. 19	Feb. 20	Feb. 21	Feb. 22
30.026	30.206	30.234	30.350	30.401	30.398	30.308
30.895	30.026	30.205	30.273	30.350	30.303	30.105
MAXIMUM AND MINIMUM THERMOMETER.						
57	56	57	56	61	64	66
51	47	47	47	48	40	51
MEAN DAILY HUMIDITY.						
83.3	82.3	79	80.3	76	78	68.3
PREVAILING WIND.						
SE	NW	NW	NW	NW	NW	N
WIND—WIND TRAVEL.						
138	173	133	102	95	93	133
STATE OF WEATHER.						
Cloudy	Fair	Fair	Fair	Fair	Fair	Clear.
RAINFALL IN TWENTY-FOUR HOURS.						
1.37						
Total rain during the season, from July 1, 1880, 25.091						

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company,

Nevada Block, room No. 37, San Francisco, February 15th, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 64) of Fifty (50) Cents per share was declared, payable on Monday, February Twenty-first (21), 1881. Transfer Books closed until the Twenty-second (22d) instant. P. JACOBUS, Secretary pro tem.

ANNUAL MEETING.

The regular Annual Meeting of the Stockholders of the Peytona Gold and Silver Mining Company will be held at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California, on Monday, the Twenty-eighth (28) day of February, 1881, at the hour of 12 M., for the purpose of electing a Board of Directors to serve for the ensuing year, and for the transaction of such other business as may be presented. Transfer books will close on Friday, February Twenty-fifth (25), 1881, at the hour of 12 M.

J. W. PEW, Sec'y.

Office—310 Pine Street, Room 15, San Francisco, Cal.

Booth Gold Mining Company.—Location of principal place of business, San Francisco. Location of works, Auburn, Placer County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the Second (2) day of February, 1881, an assessment, No. Three (3), of Three (3) Cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room No. 44, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Seventh day of March, 1881, will be delinquent, and, in default of payment, the same, unless payment is made before, will be sold on the Twenty-eighth (28) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors. GEO. R. SPINNEY, Sec'y.

Office—Room No. 44, No. 310 Pine Street, San Francisco, Cal.

Blue Bird Mill and Mining Company.—

Location of principal place of business, San Francisco. Location of works, Globe District, Pinal County, Arizona.

Notice.—There are delinquent, upon the following described stock, one account of assessment, No. one (1), levied on the eighth (8) day of January, 1881, the several amounts set opposite the names of the respective shareholders, as follows:

Nams.	No. Certificate.	No. Shares.	Amount.
West Evans.....	2	6	\$00 30
James Daly.....	1	6	00 30
W H Knight, trustee.....	5	100	5 00
W H Knight, trustee.....	6	100	5 00
W H Knight, trustee.....	7	100	5 00
W H Knight, trustee.....	8	100	5 00
W H Knight, trustee.....	9	100	5 00
W H Knight, trustee.....	10	50	2 50
W H Knight, trustee.....	11	50	2 50
W H Knight, trustee.....	12	50	2 50
W H Knight, trustee.....	13	50	2 50
W H Knight, trustee.....	14	50	2 50
W H Knight, trustee.....	15	50	2 50
W H Knight, trustee.....	16	50	2 50
W H Knight, trustee.....	17	50	2 50
W H Knight, trustee.....	18	50	5 00
Edward Bennison.....	3	6	00 30
Edward Bennison.....	44	100	5 00
John T Soule.....	30	150	7 50
J T Soule.....	25	300	15 00
J T Soule.....	26	100	5 00
J T Soule.....	73	25	1 25
J T Soule.....	74	25	1 25
J T Soule.....	75	25	1 25
J T Soule.....	76	25	1 25
J T Soule.....	77	50	2 50
J T Soule.....	84	200	10 00
J T Soule.....	86	13,500	925 00
J T Soule.....	101	50	2 50
J T Soule.....	83	90	4 50
Warren Holt.....	32	20	1 00
Edmund Braydon.....	34	500	25 00
Edmund Braydon.....	35	500	25 00
Edmund Braydon.....	48	1000	50 00
T M Wattie.....	38	200	10 00
Geo Bennison, trustee.....	40	100	5 00
Geo Bennison, trustee.....	41	100	5 00
Geo Bennison, trustee.....	42	100	5 00
Geo Bennison, trustee.....	43	100	5 00
Geo Bennison, trustee.....	45	500	25 00
F P Thompson.....	58	1000	50 00
F P Thompson.....	89	3123	156 15
F P Thompson.....	96	2500	125 00
M Griffith.....	55	750	37 50
Isaac W Smith.....	59	1000	50 00
W C Manson.....	62	200	10 00
David Grum.....	88	8245	312 25
Donald MacKenzie.....	94	200	10 00
C B Rawson.....	92	50	2 50
C B Rawson.....	93	100	5 00
Netty Grady.....	95	50	2 50
E B Perrin.....	90	1651	77 55
Mrs Mary Chamberlin, trustee.....	102	1000	50 00

And in accordance with law, and an order of the Board of Directors, made on the eighth (8) day of January, 1881, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, No. 10 Market Street, on Monday, the fourteenth (14) day of March, 1881, at the hour of 2 o'clock, P. M., of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale. W. H. KNIGHT, Sec'y.

Office—No. 10 Market Street.

Amusements.

BALDWIN'S THEATER.

THOMAS MAOUIRE.....Manager.  
CHAR. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer

TRANSPORTED FOR LIFE.

Corner Market and Powell Streets. Open every evening and Saturday matinee. Box office open daily.

STANDARD THEATER.

ARMORY BUILDING.....Manager.

UNKNOWN.

Bush Street, between Kearny and Montgomery. Open every evening and Saturday matinee. Box office open daily.

BUSH STREET THEATER.

CHAS. E. LOCKE.....Lessee and Manager.

MINSTRELS.

Open every evening and Saturday Matinee.

THE TIVOLI GARDENS.

KRELLING BROS.....Managers

THE BOHEMIAN GIRL.

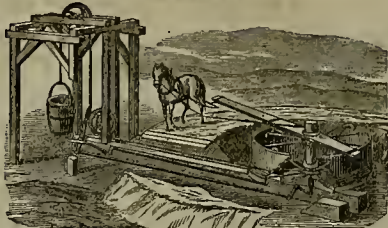
Eddy Street, between Market and Mason. Open every evening.

INCERSOLL

ECLIPSE ROCK DRILLS.



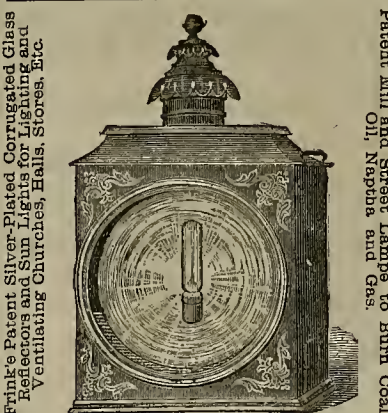
The Most Economical Air Compressors in the Market.



MINERS' HORSE-POWER.

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending the drum. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing

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49 Fremont St., S. F.



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Hydraulic Mining and Locomotive Head Lights, with the Latest Improvements, making them the best and cheapest in the market.

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Plastic Cement and Hair Felt, with or without the Patent "AIR SPACE" Method. Cement ready for use by the barrel.

G. C. FOWLER, No. 413 Pacific St., S. F.

'49 AND '50.

MR. JOHN VANCE CHENEY'S new historical story of early days upon this Coast will be commenced in the next number of "The Californian."

A NEW SERIAL STORY will be commenced in the next number of THE CALIFORNIAN which will run during the remainder of the year. It is entitled "'49 and '50," and is a story of early days upon this coast. The author is Mr. John Vance Cheney, whose articles in the leading Eastern magazines and in THE CALIFORNIAN have received such wide and merited recognition. Mr. Cheney has had this story in preparation for THE CALIFORNIAN for some time. Competent critics, to whom it has been submitted, pronounce it at once realistic and fascinating. The stirring events of 1849 and the succeeding year are vividly pictured. Absolute truthfulness of impression is sought rather than idealization. A thread of romance runs through the work, and the interest is sustained to the end.—(Note Book).

NOW IS THE TIME TO SUBSCRIBE.

"This magazine is only in its second year, but the merit shown renders it worthy of patronage from all parts of the country."—[Liberal Press, Woodbury, N. J.]

"An exceptionally bright periodical."—[New Haven Palladium.]

"A welcome visitor comes to us each month from the far off Pacific Coast. It is THE CALIFORNIAN, whose literary worth compares well with Eastern contemporaries. The January number is brimful of good things."—[Louisville Post.]

"There is a long list of attractive contents. It is an excellent number of a very good magazine."—[Philadelphia Inquirer.]

READ

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'49 AND '50.



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OF ALL KINDS.

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Marine, Stationary and Portable Boilers, Smoke Stacks  
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Repairing promptly attended to at the lowest  
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Flouring Mills, Saw Mills and Quartz Mills Machinery  
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### Golden State & Miners Iron Works,

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Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

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All kinds of Brass, Composition, Zinc, and Babbitt  
Metal Castings, Brass Ship Work of all kinds, Spikes,  
sheathing Nails, Rudder Braces, Hinges, Ship and Steam-  
boat Bells and Gongs of superior tone. All kinds of Cocks  
and Valves, Hydraulic Pipes and Nozzles, and Hose Cou-  
plings and Connections of all sizes and patterns, furnished  
with dispatch. PRICES MODERATE.  
J. H. WEED. V. KINGWELL.

### California Machine Works,

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119 Beale Street,

San Francisco.

General Mechanical Engineer and Machinist.  
Steam Engines, Flour, Quartz and Mining Machinery.  
Sole manufacturer of Brodie's Patent Rock Crushers and  
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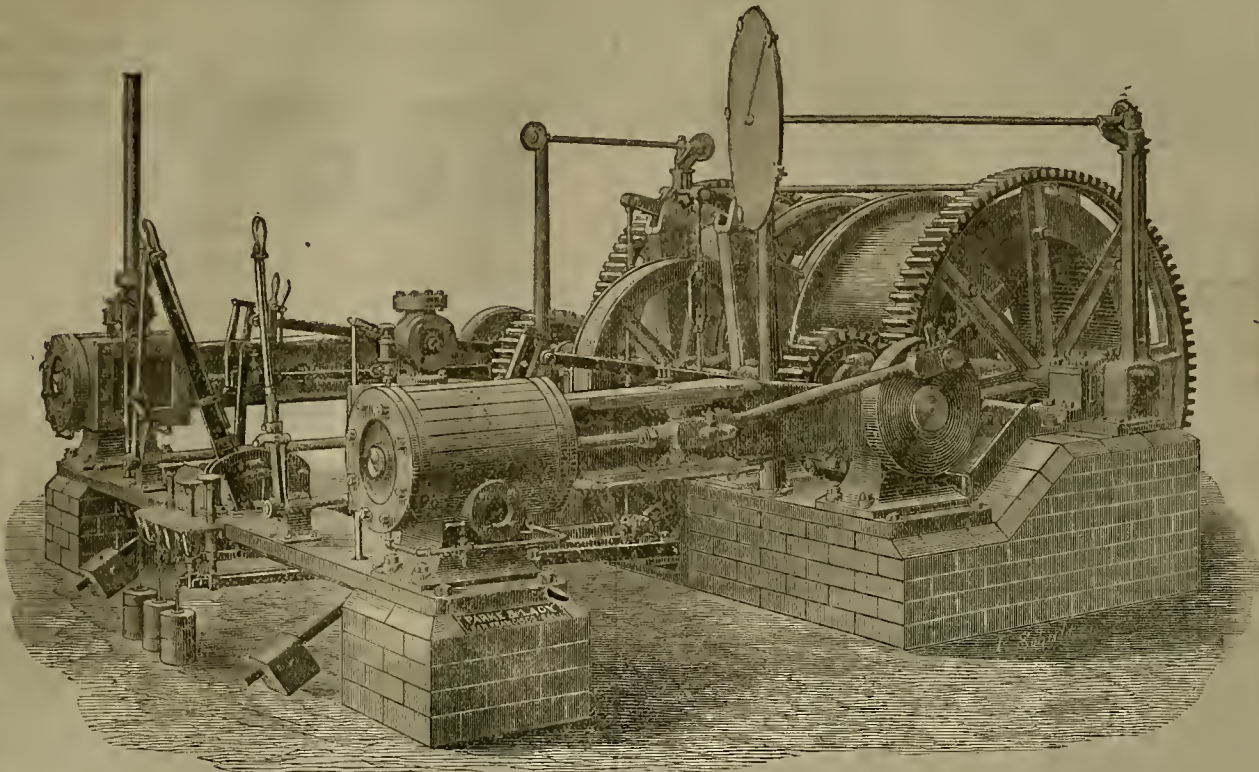


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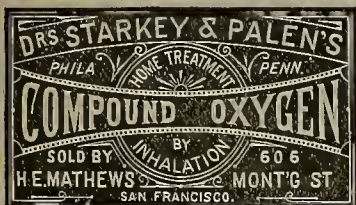
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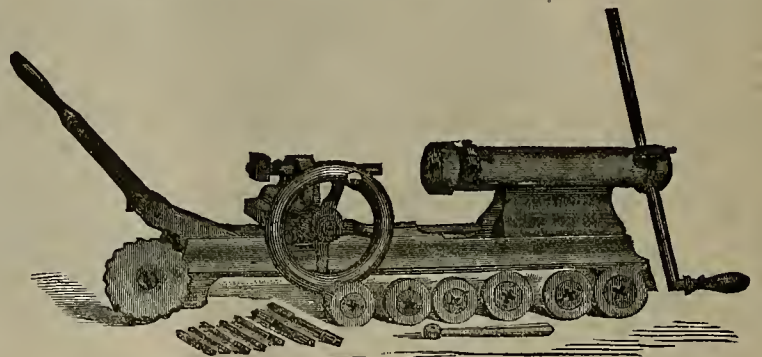
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BY DEWEY & CO.,  
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SAN FRANCISCO, SATURDAY, MARCH 5, 1881.

VOLUME XLII  
Number 10.

## Concentrating Tailings.

An ore concentrating pan or box has lately been devised, which answers as an amalgamator as well, and which is so constructed as to impart to the tailings or pulp, a very peculiar shaking motion, by means of which the precious metals are settled to the amalgamating plate at the bottom of the pan or box. This is provided with riffles and set on an incline. It has a fixed pivot at one corner or at one side of the central longitudinal line, and diagonally opposite to said pivot are stops or lugs, between which revolves an alternately disked cam wheel, whereby a lateral rolling, as well as a vertical motion, is imparted to the pan. The pan is hung by means of chains at the corners, and the plate on the bottom is amalgamated.

The pulp or tailings, mixed with water, pass into the box, the whole being thoroughly mixed up by the peculiar motion. By the diagonal motion of the pan the sand and water are given a partially side, partially backward shake, which spreads it evenly over the pan, causing a thorough intermingling of the sand and water, and a settling of the gold to the bottom, where it is caught by the riffles and plates. As the pivot is a fixed one, there can be no longitudinal or endwise motion of the pan, which would tend to discharge its contents; but as the motion is an oscillating or swirling one, there is a backward and upward motion given to the sand, which ensures settling. At the end of each stroke the vertical shake imparted by the cams serves to prevent the gathering of the sands on the surface of the plates, and to loosen it to allow the gold and mercury to settle. In conjunction with the diagonal shake, the vertical motion serves to impart a semi-rolling motion to the sand, turning it over and over, giving the heavy particles an opportunity to settle to the bottom.

If this appliance is used in lieu of other apparatus at the end of the plates of a mill, a series of two or more pans may be used, connected by sluices.

## Tanite Emery Grinder.

The accompanying engraving represents the Tanite emery grinder which is one of the several varieties of grinding tools manufactured by the well-known Tanite company, Stroudsburg, Pa. The tool shown is a No. 2 run wheels from eight to twelve inches in diameter. The machine is intended to be set on a lathe or work bench. It has a steel arm one-sixteenth inch diameter in the bearings and turned at the ends to one inch. The flanges are four inches in diameter. It has cone pulleys to give two rates of speed. Each machine is provided with two face and two side or surface rests.

The regular or specified speeds for wheels to run on the No. 2 grinder, calculated at 5,500 feet per minute, for a point on the periphery of the wheel. Eight-inch wheel, 2,700 revolutions per minute; nine-inch, 2,400 revolutions; ten-inch, 2,160 revolutions; and twelve-inch, 1,800 revolutions. This machine is well suited to general machine work, and one of them can be seen at H. P. Gregory & Co.'s 2 and 4 California street, agents for the Tanite company. This grinder is run with a 2½-inch belt and can be run from above or below with equal facility.

The Wood river fever rages high in Salt Lake City at present. There are 400 miners and prospectors in that city awaiting the arrival of spring, and every last one of them bound for the new El Dorado. The rush will be something immense as soon as the snow begins to disappear.

## Extraction of Gold from Sulphurets.

The extraction of gold without quicksilver is limited principally to that class of ores in which the gold is not free; that is, not in metallic condition, but combined with sulphur, arsenic or tellurium. Ores containing free gold, finely divided, the gangue of which is quartz without admixture of sulphurets, can be treated by chlorine gas directly without roasting, in the same way black sand may be treated, but sulphurets,

too wet, but only moist enough to allow its being sifted. On the bottom of the bucket, *a*, shown in the engraving, some clean rock or broken glass is placed about two inches deep, and covered with a piece of moistened canvas. A short glass pipe, *c*, a quarter of an inch in diameter, is inserted close above the bottom.

The ore, *d*, is then introduced, filling up two-thirds or less of the space as loosely as possible, and covered with a wooden or iron cover and pasted all around with dough. The cover is provided with a short glass tube, like *c*, to which an india rubber tube, *f*, for carrying the

atic acid. Through the pipe, *o*, it enters the bucket and ascends slowly till it reaches the cover, escaping then through the rubber pipe, *f*, where it must be examined from time to time by dipping a glass rod into ammonia and holding it to the end of the pipe, *x*, which leads out of the room. In contact with chlorine the ammonia evolves white fumes, and chlorine can be detected by these means wherever it may escape. The gas is allowed to pass through the bucket as long as chlorine is created. In this condition, by stopping up the pipe, *x*, if no more chlorine is evolved, the apparatus may stand until the next day. The cover is then removed, the pipe, *o*, taken off, a clean glass or porcelain vessel, as indicated by *z*, placed below *c*, and cold water carefully poured over the ore till the bucket appears to be full. The solution which comes out at *c*, must be examined at times in a small tumbler with a few drops of a solution of sulphate of iron. If the clear solution remains unchanged, without becoming darker, the lixiviation is finished.

To the solution in the vessel, *z*, a few drops of muriatic acid, and then sulphate of iron, or green vitriol (dissolved), is added and stirred with a glass rod. The whole is allowed to stand till all the gold is precipitated and the liquid is perfectly clear. This is drawn off by means of a syphon, for which the rubber pipe, *z*, can be used. The remaining fluid and the precipitated gold are gathered on a filter, washed with warm water and dried with the filter in a porcelain cup, above an alcohol lamp. The filter is burned either free or under a muffle, care being taken not to lose a particle of the filter ashes; mixed with some lead it is then cupelled and the gold button weighed. A comparison with the assay shows to what percentage the chlorination has proceeded.

FOUNDRY NOTES.—The opening of spring will revive the foundry business of this city, which is rather dull at present. The Ris-

donworks are employing some 400 men, however, having in addition to general work a good deal of marine machinery on hand. They have furnished all the hydraulic pumping machinery to the Comstock. The Pacific has lately shipped some furnaces to Arizona, and the Fulton is engaged on considerable mining machinery. The Union works keep a number of men at work all the time, but none of the foundries expect any great activity for a month yet.

THE Mayor of Oakland in his message states the total valuation of municipal property [at \$1,061,595, or \$250,000 more than the city's indebtedness; taxable property within the city limits, \$28,691,610; taxes levied, \$341,443.94, out of which only the sum of \$577.05 is delinquent. He favors reform in the educational system, and disapproves the teaching of higher branches in the public schools. The tax levy has been fixed at \$1.05 on the \$100.

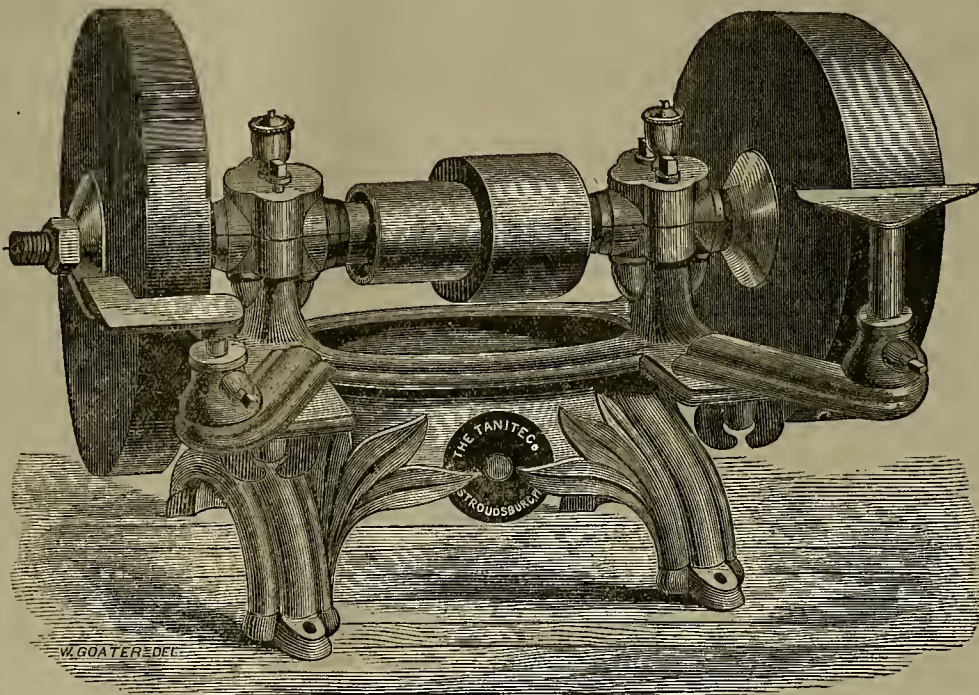
PRIVATE advices from Harshaw, Arizona, say there is a great excitement, caused by the striking of a chimney of ore on the Harshaw mines. The cropping are 15 ft. high and 19 ft. wide.

THE advance in the price of lead is caused by its scarcity in the Eastern markets, and the prospects are quite favorable for still higher prices.

A CORRESPONDENT writing from Candelaria says many buildings are being torn down and moved to Gold Mountain. Candelaria is very dull.

YIP YAP, is the name of a new town opposite Croy's creek, Wood river, Idaho.

IN the Sutro tunnel the flow of water in standard gallons per 24 hours is 3,320,000.

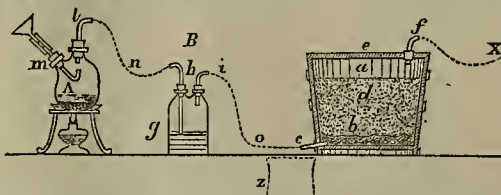


THE TANITE COMPANY'S EMERY GRINDER, NO. 2.

arsenurets or tellurides have to be subjected to a thorough roasting. Silver ores, rich in gold, can be also advantageously treated with chlorine gas after a chloridizing roasting, provided that no coarse gold occurs in the ore. Ores or sulphurets containing coarse gold are not suitable

for chlorination. Both glass tubes, *c* and *f*, must be likewise secured with dough.

The chlorine gas is generated in a glass vessel, *A*. There are two corks in it, each having a glass tube, as represented in the drawing.



APPARATUS FOR TESTING ORES BY CHLORINATION.

ble for chlorination. By this process, if properly executed, 90 to 95% of the fire assay can be extracted.

In order to be sure of a result on a large scale, it is an easy matter to make an experiment with 20 or 30 lbs. of sulphurets or of ore in the following way which is described in the Roasting of Gold and Silver Ores, by G. Kustel: (for sale by Dewey & Co., price \$3.) The named quantity must be roasted first, and it is the most difficult task, requiring either a small furnace or a great deal of patience, especially when small charges are treated on a large piece of sheet iron, having a charcoal fire beneath. In either case the sulphur must be driven out perfectly, so that when in a glowing condition, no smell of sulphurous acid can be observed. When finished, a sample is taken for an assay, and the roasted stuff moistened with water, after the weight of the whole has been noted.

A common water bucket is then prepared to receive the moistened ore, which must not be

too wet, but only moist enough to allow its being sifted. The cork, *l*, is removed and the vessel charged with three ounces of peroxide of manganese, four ounces of common salt, and 4½ ounces of water, all well mixed. The cork is inserted again and well secured with dough. Another vessel, *B*, provided with two necks, contains water, as indicated by *g*; the glass tube, *h*, dips about one-half an inch into the water. The corks are made air-tight like the others in *A*. The whole apparatus is now joined together by rubber pipe, *n* and *o*, fitting tightly to the glass tubes. Having all thus prepared, 7½ ounces of sulphuric acid are poured through the safety-tube, *m*, but only in small portions and at intervals. When the bubbling of the water at *g*, in the vessel, *B*, is not lively enough, some more acid is introduced, and finally the temperature raised by an alcohol lamp. If all the joints have been luted carefully with dough, not the slightest inconvenience will be met with. The chlorine gas from the generator, *A*, is forced through the water in *B*, by this means washed from muri-



## Notes on the Marine Fishes of the Pacific Coast.

[Read before the California Academy of Sciences by W. N. LOCKINGTON.]

A recent issue of the proceedings of the U. S. National Museum contains a full list of the marine fishes of the Pacific coast, U. S. A., including in all 270 species.

There have been only three additions since the date of my last paper upon this subject. These are *Crystalllogobius eos*, discovered and described by Miss Rosa Smith, of San Diego; *Myctophum procellarum*, a rare deep-sea fish found in the northern part of our coast by Dr. Bean, of the Smithsonian Institute, and described by him, and *Prionotus stephanophrys*, Lockington. *Scomberesox brevirostris*, Peters, has, on one occasion at least, occurred in our markets, to which it was sent from Monterey; and *Salmo clarki*, Richardson, *S. mykiss*, Walbaum (the salmon trout), *Oncorhynchus keta* and *O. kisutch* (the dog-salmon) are recorded from San Francisco bay. Thus, out of a total of 16 salmonids known to occur in our streams and on our coasts, 10 are found in our bay, including four salmon (*Oncorhynchus*), three of trout and three of smelts.

The rigid enforcement of the rules of priority adopted in England and America have changed many names which were fast becoming familiar; thus, the salmon known as *tsupitch* is now *keta*, because the latter name was the one first used, in print, to designate the species; that known as *canis* is *kisutch*, and *Salvelinus bairdi*, the Dolly Varden trout, after having been proved identical with *S. spectabilis*, Grd., must now be known as *S. malma*. Many other similar changes have been made, the enumeration of which would weary all present, but it may be admissible to remark that the well-known generic name of *Engraulis*, long applied to our anchovies, must give way to *Stolephorus*; that *Cybius concolor*, the Spanish mackerel, our *bon-vivants*, so highly prized, is now *Scomberomorus concolor*; and that the gar-fish found south of Point Concepcion must no longer be called *Belone exilis*, but *Tylosurus exilis*.

I regret that an attempt I made to enbalm an esteemed member of this academy in ichthyological nomenclature has proved futile. My bag-fish, *Bdelostoma stouti*, now rejoices in the name of *Polistotrema dombeyi*, Muller. No allusion to Dickens.

### Gasterosteidae.

The fishes of this family are commonly known as sticklebacks, on account of the isolated sharp spines which represent the first or spinous dorsal of other fishes. The family name is derived from the bony shields upon the abdomen, formed partly by the bones of the thoracic belt or shoulder-girdle, partly of the pelvic bones, which appear externally. There are no true scales, but the sides of the body are in some cases plated, or partially plated.

The sticklebacks seldom exceed two inches in length, and are thus too small to be of economic value, at least to the white races. They occur in both fresh and salt water, mostly in shallows, marshy pools, and small brooks and ponds.

Seven species are enumerated by Dr. Gerard (U. S. P. R. Rep. X.) as inhabiting the waters of the Pacific coast, but on further examination these have dwindled to three, viz: *G. serratus*, *G. microcephalus* and *Eucalia Williamsoni*. *G. serratus* is probably identical with *G. aculeatus*, a widely-spread species, occurring in the Eastern States and in Europe. The variety found in California, and formerly considered to form several species, differs from the typical *aculeatus* in the slightly greater comparative depth of the body.

*G. microcephalus* may be known by the small head, deeper body, and shorter anal and soft dorsal fins. It occurs at the mouths of streams and similar situations, and has been taken in salt water at Monterey by Prof. Jordan.

*E. Williamsoni* will, Prof. Jordan tells me, probably be identical with *Eucalia inconstans*, a species found in Ohio, Minnesota and Kansas, and noticeable both for its pugnacity and for its nest-building habits.

### Syngnathidae.

The *Syngnathidae* or "pipe-fishes," which form the principal family of the order *Lophobranchii*, are tolerably well represented in Californian waters, since four species are on record. The fishes of this family are exceedingly elongated, and covered with a continuous series of more or less bony rings of plates, movable upon each other. The bones of the jaws are united together into a long tube, at the tip of which the small mouth is situated. There are no ventral fins, and the movements of the body are principally executed by means of the dorsal and pectorals. The most curious characteristic of these fishes is the assumption by the male of the duties which in other creatures devolve upon the female. Beneath the body of the male is an elongated pouch, in which the eggs are ranged after they are laid by the female. In this receptacle the eggs remain till they are hatched, and the young until able to take care of themselves.

The pipe-fishes usually occur in salt, but occasionally in fresh water. On one occasion I was shown a specimen which found its way through the water pipes to the faucet of a sink. The largest specimens taken in the Bay of

San Francisco are about 18 inches long, but as fishes of this length do not exceed three-quarters of an inch in thickness in the center of the body, they are of no value as food fishes, especially as they do not occur in large quantities.

Small specimens are frequently brought to market, mingled accidentally with anchovies and other small fishes. The species in the Bay of San Francisco is *S. griseo-lineatus*, Ayres, which is believed by Prof. Jordan to be identical with *S. californiensis*, Storer, notwithstanding certain variations in the number of fin-rays and the length of the snout. South of San Francisco the variety described as *californiensis* is most common, and short-nosed examples were found at Soquel, where this form is very abundant. Three other species come in south of Point Concepcion.

### Ophidiion Taylori (Sand Eel).

This species, the only one of its family upon this coast, is an excellent food fish, but does not appear to be sufficiently abundant to be of much value, although it occurs along the entire length of the State of California. The largest I have yet seen was about a foot in length. In the *Ophidiidae* there are no ventral fins in the position usual among the related families, but their place is taken by two long bifid filaments attached to the central portion of the hoid bone.

Some fishes of a neighboring group, the *Brutulidae*, have filaments in lieu of ventrals, but these filaments are attached to the shoulder girdle or thoracic arch, the position usual among the *Anacanthini*. The sand-eel, although rather eel-like in its proportions, is deep immediately behind the head, thence tapering gradually to the tail. The vertical fins are continuous, low, even and many rayed; the head is rather large, and the mouth bears teeth upon the jaws (in a band) and also on the vomer and palatines.

The general color is olivaceous brown, becoming lighter below, and the sides are decorated with several rows of darker spots, one or two of the uppermost of which are continued to the caudal peduncle, while the others fade out more or less posteriorly.

The structure of the swim-bladder is curious. The anterior portion is narrower than the posterior, and has thicker walls, while two saucer-shaped ossicles are attached to its anterior extremity.

### Zoarceidae.

The *Lycodidae* or *Zoarceidae* are known to be represented by at least two species upon this coast. Examples of both species were described by the writer (Proc. 21, S. Nat. Mus., 1880, 326) under the name of *Leurynnis paucidens*. In the last sheet of the manuscript, which was unfortunately omitted in printing, dimensions were given, and the existence of a large-mouthed and a small-mouthed form was mentioned, but was passed over as possibly only an individual or sexual difference. Large numbers of the small-mouthed form have been obtained by the U. S. Fish Commission, and it is evident that they are distinct.

The name *Lycodopsis*, given by the Norwegian naturalist, Collett, was published before *Leurynnis*, and must, therefore, replace it. Blennidae.

The Blennoid fishes form a rather heterogeneous group, some of them closely approaching the *Anacanthini*, while others somewhat resemble the *Trachinidae*. All are comparatively elongate and compressed in form, and in some the elongation is carried to as great an extent as in the eels, and causes them to be popularly called eels, notwithstanding the differences of structure.

In the true eels (*Anguillidae*, *Muraenidae*) the sides of the jaw are formed by the maxillary bones, which bear teeth; the bones forming the shoulder girdle are not attached to the skull; the vent is placed at a greater distance from the head; and ventral fins are always absent. The *Blennidae* share none of these characteristics except, in some cases, the absence of the ventrals.

Seventeen specimens of this family are known to inhabit the coast of California. Most of them are too small to be of much use as food, especially as it is not their habit to go in shoals like smelt and anchovies, but to hide among rocks, or in similar situations separately. Three or four attain considerable dimensions, and are sometimes brought to market. The long, tapering form of the Wolf eel (*Anarrhichthys ocellatus*) and the stout and shorter olive-green *Cebidichthys violaceus*, with its crested head, must be familiar to the frequenters of our markets. *Apodichthys flavidus*, which attains a length of about a foot, and is occasionally sold in the markets, may be known by the large spoon-shaped spine at the origin of the anal fin, and is mentioned here only to introduce a kindred species, *A. fucorum*, which was first discovered by Prof. Jordan among the rock pools at Monterey, and which may readily be distinguished by the different form of the anal spine. In *A. fucorum* this spine is smaller than in *A. flavidus*, and is conical and convex on its anterior face. Some *Blennoids* of this coast have a peculiarity which is repeated in a different family (*Chiridae*), namely, the presence of more than one lateral line, or line of pores, along the flanks. The genus *Xiphister* has three such lateral lines, and is known to contain three species. *X. mucosus* is occasionally brought to market. Those I have seen there were from 15 to 18 inches in length. Like all "eels" they are high-priced fishes. Those in question were retailed at 30

cents per lb. This species may be distinguished from *X. rupestris* by its more oblique mouth, and by the more anterior origin of the dorsal fin.

*Heterostichus rostratus* is of a less elongated form, compressed, deep in front, tapering behind, with a conical head. It attains a length of about 18 inches, and now and then occurs in the San Francisco markets, but it is too rare to be of much importance as a food-fish. It may at once be known by the blotches of black, which form interrupted longitudinal bands along the body, the ground-color of which is yellowish brown. It is but rare among kelp south of Point Concepcion.

### Debris Misrepresentation.

The whole subject of hydraulic mining debris has been so thoroughly gone over of late that few fresh facts can be elicited. The anti-debris meeting held in Sacramento lately threw no new light whatever upon the subject. In the call for the meeting it was stated that evidence was in possession of the committee to prove that if hydraulic mining was stopped the rivers would be immediately restored to their normal condition. It was to be proved, too, that the late storms had washed out the debris from the canyons and that stoppage of the mining would solve the debris problem. None of these things were proved by any competent authority. Mere assertions of inexperienced and unscientific people amount to nothing. There are many who seriously charge the late floods to the debris, forgetting that similar floods occurred several times before hydraulic mining was attempted, and that districts were flooded which could not possibly be affected by debris.

But we did not start in to argue this question or refer to it at any length. We simply desire to protest against misrepresentation. There is no use in bringing forward as facts statements which, on examination, will prove to be untrue. Nor is there any use in getting angry on the subject and misrepresenting the whole matter. The question is difficult enough to settle plainly set forth. When obscured by incorrect and often maliciously false statements, it becomes more entangled than ever. One man said at the anti-debris meeting that the majority of the people of Nevada county had no interest in hydraulic mining, and that the people of Nevada and Placer counties not engaged in the business looked upon it with displeasure; that the mines were owned by foreign companies, etc. Concerning this the Nevada Transcript says:

"It is with a mass of just such untruthful testimony as the above that the miners have had to contend ever since the opposition to their interests began. Every statement embodied in the paragraph quoted is as false as false can be. Every citizen in Nevada county who possesses common intelligence trembles at the thought of the vast injury that will be wrought to all industrial and commercial pursuits carried on here should the large revenues annually derived from hydraulic mining be suddenly cut off. We do not believe there is a man living in this part of the State who does not share in this feeling. There is but one hydraulic mine in Nevada county owned by a foreign corporation, and the foreigners that own it have to send thousands of dollars here every year to pay for the improvements and developments constantly being made in connection with their property. With two or three exceptions, the hydraulic mines are all owned by residents of Nevada county. Those exceptional mines are owned in San Francisco. Every town in the county located above Nevada City (excepting Truckee and Boca) owes not only its prosperity, but its existence, to the successful continuance of hydraulic mining."

Men who know nothing at all about engineering tell us what the debris and water are doing with our rivers. Those who know nothing about the bay of San Francisco point out the injuries being done to it and the har. Competent engineers who have examined San Pablo bay pronounce the channel as deep as 20 years ago, though, however, Col. Mendell, U. S. Engineer, reports there is no danger of the har shoaling, yet we are told it is rapidly shoaling. In fact, there is a great deal of talk on this subject, which is only "talk." Half of the people who sagely discuss the subject know nothing at all about it. One man makes a loose statement and hundreds repeat it.

As to hydraulic mining, it is astonishing what ignorance is displayed concerning an industry so long maintained in California. A newspaper published in Oakland, only last week had a large engraving showing what purported to be a hydraulic mine, "where the debris comes from." A man was depicted standing close to a little bank, holding a nozzle in his hand, this being connected to a small hose. Near him were a few others breaking stones with pickaxes, and throwing back rocks with shovels. A wheelbarrow and pan stood near by. It gave no idea whatever of a hydraulic mine, and was most absurdly incorrect. Yet here it was published in California, in the second largest town in the State, and many people who will see the engraving will imagine they know what bydraulic mining is. This is one of the absurdities of the question, but is only one of them. There are many others too numerous to mention.

The bullion of Paradise mine, at Spring City, is said to be producing more ore than the company can dispose of.

### Trade Marks and Trade Names.

In the case of John W. Shaeffer vs. Francis Korbel et al., Judge Hayne, of the Superior Court, last week, rendered final judgment for costs in favor of the defendants and against the plaintiff. The case was commenced by Shaeffer, a cigar manufacturer, against Korbel Brothers, box manufacturers, to recover damages and also to obtain an injunction against the latter. Shaeffer claimed that Korbel Brothers had invaded his rights in their branding and using upon cigar boxes manufactured and sold by them, the following terms and phrases, which had been employed by Shaeffer as trade marks upon boxes and cigars made and sold by him, viz: "Chromo," "Oregon," "Grape," "Bon Ton," "Beauty," "Victoria," "Imperial," "Private Cuvee," "Red Seal," "Tony," "Fruit," "Green Seal," "Eclipse," "Slug," "Don Juan," "Columbus," "Star and Garter," "Give us a Light," and "Little Devil." It was decided that generic names or words in common use, descriptive of an article of trade, its quality, ingredients or characteristics, could not be adopted or appropriated as trade marks, and that Shaeffer, the plaintiff, had no right to the adoption of those terms or phrases as trade marks, and no claim to their exclusive or absolute use as such, and judgment was accordingly rendered against Shaeffer for costs of the action. John L. Boone appeared as attorney for the plaintiff, and Chas. Wittram for the defendant.

In the case of J. K. Prior vs. Alexander Badlam and Thomas Dunphy, Judge Hunt has filed the following decision in the Superior Court: This is an application for an order to restrain defendants from using, in connection with their business of bill posting, the name of "Key & Co." It appears from the affidavits herein, that the defendant, Dunphy, was, during the lifetime of A. C. Key, his agent and accountant. Key died in 1874, and his executors, one of whom was Dunphy, carried on the business of bill posting for the benefit of the estate. Subsequently Dunphy resigned as such executor, and thereupon formed copartnership with defendant, Badlam, to carry on said business on their own behalf. Accordingly, the defendant hired the place of business formerly occupied by the deceased, and advertised said business as follows: "Thos. Dunphy, late Manager of Key & Co."

It is alleged in the complaint that the words, "late manager of" are painted on said sign in letters so small, and the name, "Key & Co." in letters so large, as to deceive the public. If this were true, there is no doubt of the power of a court to restrain such a use, on the ground that the public may thereby be deceived; but here it is expressly denied in the answer and affidavits of defendants that such is the fact. In view of these denials, I consider it would be improper, in advance of trial, to practically adjudicate the case, by granting an injunction, which is the sole relief sought in and the sole object of this action. Applications denied.

THE EAST HAS NOW COMPLETED ITS MINING EDUCATION.—The East has graduated in mining in the school of experience. The people of that section of our beloved country say the price was high, but cheap as could be expected for such good schooling. The Boston Economist says: "We think it admits of no doubt that mining operators and professional promoters will, in the future, find it much less easy to advance their schemes in the Eastern market and among Eastern investors than they have in the past. The Eastern public has undergone during the last few years a severe and practical course of education, and though it is poorer by millions of dollars in money than it was before that course began, it is decidedly richer in experience which is likely to prove finally of incalculable value to it. It has learned that there are mines and mines; it has learned that 'bonanzas' are of such frequency that they have ceased to have the attraction which should be accorded to good, honest worth of medium promise; it has learned that the issuance of neatly engraved stock certificates representing a capitalization somewhere in the millions is not necessary evidence of the existence of a mine; and finally it has learned that mining, no more than any other business enterprise, is to be undertaken in a blindfold condition. These are things that it was absolutely necessary that the public should learn sooner or later, and we do not know that it could have been acquired at a lower price."

BULLION PRODUCT OF THE WORLD.—The Boston Economist says the production of gold in 1880 throughout the world amounted to \$118,000,000 (\$89,000,000 of which was produced in America); of silver, \$94,000,000 (of which \$76,000,000 was produced in America); total of both, \$212,000,000. The largest production in any one year was in 1853—of gold \$236,000,000; of silver, \$49,050,000; total of both, \$285,000,000. Since that year, the annual product of gold has diminished one-half, and that of silver has nearly doubled.

THE Black Diamond Coal Company, of Nortonville, are preparing to sink a shaft for pumping water from the mine at a point on the east side of the railroad and south of the hoisting works about one-fourth of a mile.



## MECHANICAL PROGRESS.

## Effect of a Galvanic Current Upon the Absolute Strength of Iron Ware.

Some experiments made by G. Hoffmann to determine this point have recently been made public, and will perhaps surprise many of our readers, some of whom will expect to find that electricity has no effect upon strength, while others will be disappointed to find this influence so slight. The wires employed were very small, ranging from one-fifth two-fifths of a millimeter in diameter. (One line is about equal to two millimeters.) A piece of each wire, one meter long, was clamped at both ends between steel plates, and thus suspended at one end while a scale pan hung from the other end, and in it were placed, at first, weights, then fine sand was poured in until the wire broke under the strain. The experiments were conducted between 68° and 77° Fahr., and mostly after the passage of a current, a few, however, during its passage. Feeble currents were employed, and those as constant as possible, and with every practicable precaution. The duration of the separate experiments was almost always the same.

In every case there was an increase of strength, and when the passage of the current lasted three hours the weight requisite to break the wire was increased from 12 to 92 grains.

With increased time there was an increase of strength up to a certain maximum, which was attained in some wires sooner than in others. Thus wires which gained in three hours 12 to 28 grms., gained in 12 hours 23 to 44 grms., and in 25 hours 24 to 50.

With feeble currents the increase of strength for equal time was nearly proportional of the strength of the current. If the current was somewhat stronger this law did not hold any longer, owing to its heating the wire. The strength seems to be greater while the current was passing than after it was broken.

Hoffmann thinks that while this increase of cohesive power was partially due to the heat generated by the current, the galvanic current itself played its own essential part therein.—*Indianapolis Journal*.

**A NEW ELECTRIC LIGHT BURNER.**—For over 20 years Mr. Holland, the gold pen manufacturer, of Cincinnati, has been experimenting with iridium, seeking some method by which it might be fused. Some time ago he discovered a flux which he mixed with the iridium dust, and successfully fused it in a common crucible in the ordinary draft furnace. He cast the metal in any shape desired, and in bars of ingots weighing as much as 10 ounces. The metal thus fused and cast defies the file and resists all acids. The only mechanical way of cutting it is by friction, with a copper wheel charged with diamond dust or fine corundum. Prof. Nelson Perry, of the Cincinnati University, regards this as one of the most wonderful discoveries in metallurgy he ever knew. As soon as his discovery was made, Mr. Holland saw that iridium would be valuable as a burner for electric lights. Iridium burners two inches long, and from one-eighth to one-sixth of an inch thick were tested, but the machinery used was found to be too powerful for an incandescent light, which is all that was aimed at with the iridium burner. The light produced, however, was very pleasant, and no glass globe was necessary as the atmosphere produced no effect on the metal. Experiments are now in progress with the Maxim machine, the electric current of which can be more easily regulated. A set of burners can be furnished for about \$4, and these burners will radiate a 10-candle light, upon present calculations, for an indefinite time. Mr. Holland has patented his discovery in this country, and also in Europe.

**TORSION.**—If we know the force in pounds per square inch that it takes to sheer any material, then that required to break a cylinder of it by torsion would be the leverage in inches, divided into half the shearing force in pounds per square inch, times 3,1416 times the cubic root of the cylinder area in inches. A square shaft is about one and one-fifth times as strong against torsion as a round one, and one-fifth less than a round hollow one of the same sectional area. Hollow shafts resist torsion better than solid ones of the same area of metal. Wrought iron shafting, supported at eight or nine ft. intervals by self-adjusting hangers, may have a diameter equal to the cube root of the number of horse-powers it transmits, divided by the revolutions per minute and multiplied by 125. The faster shafting revolves when transmitting a given number of horse-powers, the less the torsional strain.—*Indianapolis Mechanical Journal*.

**NEEDLE FOR BELT LACING.**—H. Royer, S. F. This invention relates to a novel device by which the rawhide thong or threads, or other material which is used to connect the ends of belts, is drawn and laced through the holes or eyelets prepared for its reception, causing the belts to be secured with greater facility than has hitherto been attained. It consists of a rigid tapered bar, having its larger end split so as to give sufficient elasticity at the split end. One or more sharp projections are firmly inserted in one of the sides, of such a length as to take firm hold of the cord or thong placed thereon, and having a slight inclination toward the point for the purpose of more firmly holding the cord or thong.

## Production of Malleable Nickel.

The brittleness of metallic nickel has always been an obstacle in the way of manipulating it. This quality has long been suspected to be due to the fact that the metal in the course of its preparation absorbed oxygen to a greater or less degree. Acting upon this theory, which is *a priori* reasonable, from the fact that it is known to have been verified in the case of copper and certain other metals, numerous efforts have been made to incorporate with it, during fusion, certain metallic or other substances, which should have the power of removing the oxygen while not impairing the good qualities of the product by its presence. With this object in view, the addition of small quantities of magnesium, and of manganese, to fused nickel, have been tried, and in the case of the first named, with considerable success.

Guided by the remarkable success that has attended the addition of phosphorus to copper alloys, as is shown in the production of phosphor bronzes having extraordinary tensile strength, M. Garnier, who is largely interested in the production of nickel, has made some experiments on the addition of phosphorus to this metal, with the view of improving its malleability, which, as we are informed, have given unexpectedly good results. From the accounts of these experiments which have come to hand, it is affirmed that if phosphorus to the amount of 1 in 3,000 be added to nickel, the metal becomes soft and very malleable; the addition of a larger quantity of phosphorus develops the hardness of the metal at the expense of its malleability.

The phosphorus is added to the metal in the form of a phosphide of nickel containing six per cent. of phosphorus, which in turn is made by fusing together a mixture of calcium phosphate, silicic acid, carbon and metallic nickel.

The assertion is further made that the nickel produced by treatment with phosphorus, is not only malleable of itself, but that its alloys with copper, zinc or iron are likewise soft and malleable.—*Manufacturer and Builder*.

## Another "New" Locomotive.

The Hinckley Locomotive Works of Boston are building a locomotive on a somewhat novel principle. It is the invention of Mr. Henry D. Shaw, and is described as follows in the *Boston Journal of Commerce*:

His peculiar idea in this matter is that of running the locomotive with two cylinders upon either side. One cylinder is attached to the crank upon one side of the center of the wheel, and the other cylinder to the opposite side of the same wheel, or opposite to the first connection. These cylinders are made one above the other, a connecting rod running from each cylinder directly to its crank-pin. The lower cylinder acts directly on the wheel or crank-pin in the wheel. The outside end of the crank-pin has a connection which passes to the center of the wheel, where it is taken hold of by an outside frame or a connection to the main frame of the locomotive, and affords it a hearing, while the extension of this piece makes up precisely the same kind of a connection with the locomotive driving wheel that the ship carpenter's auger affords him with the double end in it, the cranks being each side of the center. This attachment is to be made to both sides of the engine. A yoke separates and keeps the connecting rods in place should either one let go, so that no interference is to be feared from this.

The idea is to relieve the engine of the swaying caused by taking hold at the angles and changing the pressure with each revolution at each end of the stroke. Theoretically this is correct. A locomotive is being built which will be finished within the next two or three weeks, and is, we understand, to be put over the New York and New England or the Boston and Providence railroad for a thorough practical trial. Mr. Shaw is certainly deserving of success, and we hope will meet it, as there is little doubt about the matter mechanically.

**IRON RUST IN BOILERS.**—The oxidation of iron immersed in ordinary water, says *Engineering*, appears to be largely due to two causes, namely, first, the absorption of oxygen contained in the water, and second, the absorption of oxygen set free during the decomposition of the water, hydrogen being set free in the latter case. M. Lotin, who has made a number of experiments on the corrosion of iron wires immersed in water, and various solutions, and who has described his experiments in the *Comptes Rendus*, has arrived at the conclusion that the first of the above causes of oxidation is generally of the chief importance. With both distilled and ordinary water the temperature has a very important influence. Thus, at 68° Fahr. the quantities of oxygen absorbed per square foot of iron surface per hour when immersed in distilled and calcareous waters respectively, were 0.258 grains and 0.330 grains, while at 212° the quantities rose to about 2.364 and 2.579 grains. The immersion of iron in all the waters tested was accompanied by the evolution of hydrogen, the action being least, however, in distilled water. At a temperature of about 260° Fahr., the decomposition of the water was found to be equivalent to the absorption of 0.01 grains of oxygen per square foot of surface per hour for distilled water; 0.0129 grains for calcareous water; 0.0182 grains for water containing one-fifth part of crystallized chloride of magnesium; 0.05 grains for water saturated with chloride of sodium; and 0.067 grains for sea water.

## SCIENTIFIC PROGRESS.

## Photographs in Natural Colors.

The announcement is again made that a process has been discovered for taking photographs possessing all the brilliancy and delicacy of the natural colors, and an exhibition of pictures thus naturally colored has just been held in London. According to the reports, the colors are produced by the action of light alone in the camera, and owe nothing whatever to the artist's brush. In the photographs exhibited, the coloring appeared to be quite true to nature, and delicate tones and shades were clear to the view. The flesh tint was exact to life, and full justice was done to gorgeous regimentals. The protruded tongue of a dog in one of the photographs possessed the exact color of nature. Some of the guests, says the *English Mechanic*, inspecting this collection, and not fully acquainted with the character of the latest invention, took it for granted that the work was done by skillful, artistic hands on ivory and other material, and could scarcely believe their eyes when informed that the color, as much as the form and outline, was produced by the light of day. Careful investigation, however, would then show that human handicraft was not in it; for there were touches and effects which nature's pencil of light could alone accomplish. The contention is that photographs colored by artists, however clever, must be more or less "monotonous, hard, untrue to nature, and to the originals."

The process was discovered, it is said, by a French scientist, but has since undergone improvement by the proprietor of the process in England. If the new system proves an unqualified success, the reward will not have been reaped without much labor in the past, for numerous attempts have been made to induce the sun-pencil to fix colors in the picture it draws in the camera; but chemical and mechanical difficulties have stood in the way. In the new process colors are said not only to be faithfully produced, but protected from the action of light by being passed through a hailing solution, of which gelatine forms the principal ingredient, and that some of the photographs so treated have been exposed for months to the sun without being in anywise affected by the ordeal. Unfortunately, the process is yet unknown, as it is likely to be for some time to come.—*Manufacturer and Builder*.

**THE RANGE OF THE MASTODON.**—Prof. G. C. Brodhead contributes to the *Kansas City Review* an interesting paper, in which he enumerates all the discoveries that have been made of mastodon remains in the United States. This huge animal appears to have had a wide range in this country in past ages. The earliest record that we have of the finding of the bones of the mastodon is contained in a letter from Cotton or Increase Mather to the Royal Society of London, between 1650 and 1700, describing the portions of the skeleton of one of these animals discovered near Albany, N. Y. Since that period, skeletons nearly entire, detached bones, teeth, etc., of the mastodon, have been found in nearly every State in the Union, including those of the Pacific slope. The evidence thus far obtained goes to show that the mastodon first appeared in America in Miocene times, was abundant in the Pliocene, and lingered until the close of the Glacial period, and disappeared in the early Losses. We also find that he roamed at will from Canada to South America, being found as far north as 66° N. latitude on our Western Coast.

**A GREAT STORM.**—M. Rouger has communicated to the French Academy an account of a violent storm at Laigle, in September last. Between 9:30 and 11 P. M. there were at least 4,700 flashes of lightning; sometimes there were as many as three flashes per second. The rain began about 10:45 and lasted for about an hour and a half; there was no hail. The thunder was almost continuous, like a kind of buzzing, occasionally interrupted by heavy rollings. On one of the buildings that was struck there was a zinc conducting pipe, for carrying off rain water, which was pierced with three holes, two of which were square and the third round, as if made by a bullet. They all occurred where the walls of the pipe were doubled, and in each instance the hurt was inward in the inner pipe and outward in the outer pipe.—*Comptes Rendus*.

**FREEZING WATER UNDER PRESSURE.**—The only elaborate experiments ever undertaken in this direction were made by the French physicist, Boussingault, with the view of ascertaining the condition of water when cooled considerably below its normal freezing point, under circumstances where free expansion was prevented. For this purpose, a strong cylinder of steel was filled with water at its temperature of maximum density, and a steel plug fitted tightly to the opening, thus preventing, by the strength and the practically unyielding nature of the confining vessel, any expansion of the confined liquid when cooled. The sound made by the falling of a metal ball previously placed within the cylinder, told whether the water within was liquid or solid. Under these conditions, the experimenter above named found that water remains liquid even at a temperature of -18° C. (= -4° Fahr.), but freezes instantly so soon as the plug is removed.

**CIRCULATION OF AIR IN THE ST. GOTTHARD TUNNEL.**—M. Stapf has been giving careful attention to the variations in the air currents between the two openings at Goschenen and Airolo. He finds two principal causes to be operative in these changes; first, the southern opening is 32.8 yards higher than the northern, which represents a pressure equivalent to that of a column of air 39.3 yards high at the subterranean temperature; second, the difference of barometric pressures upon the two declivities of the mountain. If the external temperature was always lower than the internal, if the barometric pressure was the same at each side, and if there were no modifications of velocity due to the heating and expansion of the air, or to the friction against the walls—the draft would always be southward. Meteorological observations are regularly taken, both at Airolo and Goschenen, to determine the elements which are required in order to know, monthly or annually, the number of days for which a given direction of current, or an absolute calm, may be expected in the interior of the tunnel.—*Les Mondes*.

**THE LICK OBSERVATORY TELESCOPE.**—Our readers are aware that the trustees of the Lick observatory have finally closed the contract for the optical part of their great telescope. There has been considerable doubt whether a refractor or an enormous reflector would be selected, but the decision is in favor of the former. The object glass is to be three ft. in diameter, and the Clarks, of Cambridge, Mass., are to make it for \$50,000. The mounting for the instrument is not yet provided for. It will probably be about three years before the telescope is finished. If the instrument proves successful, it will be the most efficient ever pointed at the heavens. Its power will exceed that of the Pulkowa glass by 44%, and it will be almost twice as powerful as the great telescope at Washington, which at present is the best of its kind.

**WHAT WE THINK WITH.**—Without phosphorus no thought. So declared a famous German physiological chemist some years ago. That particular brain substance which he supposed to be essential to thought has heretofore been known as proteogen with phosphoric acid. Considering this name not clear and definite, another German chemist has proposed for it the following precise and significant combination of 72 letters: Oxaethyltrimethylammoniumoxyhydratylepalmethylglycerinophosphosane. If mental derangement is in any way due to deficiency in the elements of this highly-complicated compound, or to any enlarging of its multitudinous constituents, the wonder is that anybody can ever think straight. And what a lot of it that German must have had in his head when he contrived such a name for it!

**ARTIFICIAL VANILLA.**—The production of any well-known substance artificially by the synthetic chemist, is generally viewed by the public with opposition, until convinced that it is identical with the natural product. A German paper produces an endorsement of artificial vanilla by Prof. Meidinger, who says it possesses undeniable advantages over natural vanilla. The latter loses its aroma, is unequal and the natural bean only contains 2% of valuable material, with 98% of worthless or even injurious material, of which the removal is troublesome and tedious, before the pure flavor can be obtained. Dr. Meidinger speaks very highly of this artificial vanilla, which he pronounces perfectly wholesome.

**DETERMINATION OF SILICON IN IRON.**—The following process is adopted by Mr. T. M. Brown: One gram iron or steel is placed in a porcelain crucible with 25 cc. nitric acid of 1.2 sp. gr. When the reaction is over 24 to 30 cc. dilute sulphuric acid—1 part acid and 3 parts water—are added, and the solution is heated till the nitric acid is entirely or nearly expelled. When the residue is sufficiently cool, water is cautiously added, and the contents of the capsule are heated till the crystals are perfectly dissolved. The solution is then filtered as hot as possible, and the residue washed first with hot water, then with 25 to 30 cc. hydrochloric acid of sp. gr. 1.20, and finally again with hot water. After drying and ignition the silica is obtained snow-white and granular.

**ARTIFICIAL SPINEL AND CORUNDUM.**—M. Stanislaus Meunier, a French savant, is reported to have succeeded in producing artificial spinel, identical in hardness and chemical composition to the natural mineral, by heating together in a porcelain tube chloride of aluminum, metallic magnesium, and the vapor of water. By the interactions of water vapor and aluminum chloride, he affirms, he has also succeeded in producing artificial corundum.

**STRENGTH OF INSECTS.**—At a meeting of the Maryland Academy of Sciences recently Dr. Theobald showed a species of a beetle and gave the following figures: Weight of beetle, two grains; weight moved by it, 5½ ounces—2,640 grains, or 1,320 times the weight of the beetle. A man weighing 150 lbs., endowed with the strength of this insect, should, therefore, be able to move 198,000 lbs., or nearly 100 tons.

**MOUNTAINS IN THE MOON.**—The moon has 28 mountains higher than Mount Blanc, that monarch of mountains in Europe. The moon's day is 29½ times as long as ours. The sun shines constantly for 15 days, making a temperature like boiling water.



SIEDER & FORNI, who have been steadily working for



the past month developing a quartz lode at the head of Dark canyon, about a mile northeast of town, have already struck pay ore, and are highly pleased with the outlook of their mine. They tapped the ledge by a short tunnel from the sidehill, and are now running in on the lode.

**SURT. CHIEF.**—The Eureka, says that they have cut through the vein on the 21 level, at a depth of 170 ft., that the ore shows well, and that a four-man force has been put on to run in on the lode both north and south.

**COPPER.**—*Mountain Democrat*, Feb. 25: Supt. Lambert, of the copper mine on the Auburn road, between Coloma and Pilot Hill, has, after a protracted absence in the East, been prompted by the enhanced demand for copper to return and renew operations on his mine, and the result thus far obtained has been much more flattering than he anticipated. He has already developed a vein, from 20 ft thick, of very handsome ore, and by driving the old tunnel forward, which, when extended 200 ft further, will give not less than 400 ft of superabundant ledge. The chief feature of this copper mine consists in the fact that it includes a gold-bearing vein that, unless the prospecting thus far done shall prove deceptive, will fully pay the expense of opening the large and apparently rich copper mine. Samples of the different formations in the main ledge, iron, garnet and copper—can be seen at this mine, and those experienced or curious in such matters are invited to call and make an examination.

**NORRIS.**—Peter Cross, the prince of prospectors, has added to his many previous discoveries one which promises to be the richest of all. He has opened a large and fine ledge near Newtown, from which a considerable quantity of \$30 to \$50-ore has been taken out within the past week. The company that bought the Chapparral mine, near Chilo, has some time ago, concluded last week a purchase of the Copper mine, Kelsey district, which is one of the richest quartz ledges in the county. It has been sufficiently prospected to justify immediate prosecution of the work of systematic development on a permanent basis, and we are told that the new company will at once commence the erection of a 20-stamp mill and hoisting works.

#### INYO.

**REARSBORO.**—*Inyo Independent*, Feb. 25: Work will be started in the Rearsboro tunnel in a few days, under the direction of T. F. A. Connelly. It is intended to run 200 ft on the tunnel. Contracts will be let for 50 ft sections.

**ANOTHER MINE SOLD.**—Mr. W. E. Smith, prominent in the Cerro Gordo mining company, the New York corporation which has purchased so many mines in Siskiyou, Swanssea district, during the week completed the purchase of the Long John mine in the same locality.

**FREE GOLD.**—*Herald*, Feb. 25: Gold dust to the amount of \$8,000 was yesterday melted into a bar at J. J. Ott's assay office, the same being the result of a clean-up in the hydraulic claim of A. C. Turner, at Hunt's hill. The run was made with free water and with a small force of men; it is, therefore, a large and most satisfactory return to the owner.

#### MONO.

**BODIE ITEMS.**—*Free Press*, Feb. 24: During the first three weeks of February the Standard Con. shipped \$201,365.03, against \$185,645.70 for the entire month of January. Last month Bodie mines other than Standard shipped \$99,044.23, which aggregate total probably be considerably increased this month, inasmuch as several more stamps have been started up, so that it is safe to predict that the bullion shipments from this district for the month of February will exceed \$400,000. The Goodahaw, Oro, South Bulwer, Boston Con., Noondays (combination), Red Cloud and Lent (Bodie-Mono combination) main shafts are being sunk, and the Blackhawk is sinking a winze (now 70 ft deep) below the 700 level. All the heavy machinery for the new Lent shaft—which may be termed the great sump of the center—is on the ground, and is being put in position with all possible dispatch. The first installment of the Standard's new and powerful hoisting machinery has arrived, and another invoice of about 20 tons is on the road this side of Carson. The new 350-horse power Harris-Corliss engine is being put in position to drive the Noonday mill, and the 10 additional stamps will be put in at an early day, increasing the capacity to 40 stamps. The new hoisting machinery at the Red Cloud shaft—the sump of the south end—will start up Tuesday morning, hoisting water through two 12-inch cast iron columns. The shaft itself is being sunk as rapidly as human skill and the most approved appliances can drive it. The Silver Hill mill is cleaning up from its last run, and will start on Blackhawk ore within a few days. At the Miners' mill a large settling tank is being put in, and the mill will resume work on Wednesday. All the other stamps in the district, 120 in number, are busy. The underground developments for the week have been most encouraging at various points along the lead. The Syndicate, at the extreme north end, is still stopping and milling ore from the 380 level, old Osceola vein. Ore from the Peacock vein, No. 20, Bodie tunnel, is yielding much better than was expected, and the north and south drifts are being worked. The ore vein in the Blackhawk, which was being followed by a winze from the west crosscut, 700 level, has taken a somewhat eccentric turn and dipped away to the eastward, but at the point where it left the winze it was still holding its own in size and quality. Con. Pacific showed marked improvement at two different points and depths during the week. Standard Con. is getting close to ore in the west crosscut, 1000 level. Adolphus, having completed the most water, has commenced on the east crosscut, 500 level, has culminated the crosscut and is now drifting north. The north drift in the large or east vein of Concordia gives strong indications of an important development at an early day.

#### NEVADA.

**HARTLEY MINE.**—*Grass Valley Union*, Feb. 25: The Surprise mining company have removed their hoisting machinery from Allison Ranch, and are preparing to set it up on the Hartley mine, which they have bought. A new incline will be sunk, over 200 ft in depth, to reach to the bottom of the old workings. Good progress will be made with this work after the new hoisting works are erected, as the ground is favorable. In the meanwhile the work of cleaning out the drain tunnel will be carried on, in order to drain off the water from the old workings. The cave which occurred in the tunnel has not yet been cleared away, and operations have to be conducted carefully, and the ground thoroughly timbered as the debris is cleared away.

**MOORE'S FLAT MINES.**—*Nevada City Transcript*, Feb. 25: The hydraulic mine, Moore's Flat, has a bright outlook. The work being done at present in the Dowling Blue Banks and Boston claims consists principally of stripping, but if the weather continues good a couple of weeks more, they will be in full blast, the 2 latter mines giving employment to about 150 men. The Chinese are pushing their tunnel ahead at the rate of 25 or 30 ft a day with Burleigh drills, and also washing some. Their tunnel will be completed this spring. The other claims in that part of the county are prospering, and many thousands of dollars will be taken out this season.

**A \$10,000 SUIT.**—E. W. Johnson has begun suit in the Superior Court of this county against the New York & Boston gold mining company, a corporation, the complaint setting forth that within the 2 years last past he was named, as defendant, and paid out for the benefit of the company diverse sums of money, amounting in all to \$16,000; that said sums of money were repayable on demand, and that no part of the same has been repaid. The New York gold mining company, which is the one intended in the complaint, was formed in New York for the purchase and development of the El Capitán mine, near this city. A few thousand dollars' worth of work was done, and the mine was abandoned. The suit is being defended. It is intimated that the suit instituted by Mr. Johnson will result in an investigation as to where all the money expended in connection with the enterprise went to.

#### PLUMAS.

**DURAN HILL.**—*Greenview Bulletin*, Feb. 25: This company has suspended operations for the winter, but will resume work again early in the spring.

**NORTH FORK.**—The mines on the North Fork of Feather river have had too much water, which has done considerable damage in carrying away sluices, derricks, etc., and completely suspending all mining for the present.

**SOUTHERN EUREKA CON.**—The new dump house is completed, and is now being filled. For the present the ore from the middle tunnel has to be hauled to the mill, but a tramway is to be constructed soon for the purpose. From the lower tunnel the ore is run direct to the mill.

**GREEN MOUNTAIN.**—The mills of the company have run uninterruptedly since the repairing of the last break in the ditch on the 10th. There is no difficulty now in maintaining a full head of water.

**SAVACOR.**—This mine is reported under full headway, with splendid prospects. The only trouble they have to contend with is in getting the ore from the mine to the mill, which is passed through chutes. The new mill works finely.

**CHEROKEE.**—No stoppage of work has occurred at the mine, though the mill could not be run steadily until within the last 3 days.

**COLA STRIKE.**—The usual activity prevails at this mine. A survey recently made shows that the Kerr tunnel has to be driven about 50 ft further to reach the Cowdin chute.

**INDIAN VALLEY.**—The payment of the purchase money for the Indian Valley & Union mine has been made. The purchasers are Corbin & Handy, who will soon turn the property over to the Indian Valley mining company, of which Mr. Frank Corbin is President, and E. A. Corbin Secretary and Treasurer. The price paid is \$100,000, which was given equally to Mr. John Blood and George F. Tins, the former of the Mosses, Corbin are of New Britain, Conn., and the other owner is Dr. George W. Handy, of Oakland. It will be but a few days before the tunnel from the Union will be connected with the Indian Valley shaft, when all the ore from the latter will be run down the tunnel to the mill, now all in complete order, and situated near the mouth of the tunnel. The ore is remarkably rich, and everything is so conveniently arranged that the cost of working it is but very slight.

#### SIERRA.

**STILL IN GRAVEL.**—*Mountain Messenger*, Feb. 26: The Bald Mountain Extension tunnel is now in near \$280 ft, 200 of which pierces fine blue quartz gravel. On removing boulders from the bottom, the holes instantly fill with water significant of a near approach to bedrock.

#### NEVADA.

##### WASHOE DISTRICT.

**C. & C. SHAFT.**—*Virginia City Enterprise*, Feb. 27: The shaft has been sunk 10 ft; total depth below the 2500 level, 30 ft.

**UNION SHAFT.**—The shaft has been sunk 10 ft. Repairs to the shaft are being made at the 1000, 2200 and 2500 stations.

**MEXICAN.**—On 2500 level are cutting out a station at the 2700 level, in the joint Ophir east winze. The joint Union Con. east crosscut has been extended 30 ft.

**OPHIR.**—On the 2700 level are cutting out a station at the bottom of the joint Mexican east winze; the joint California upraise is being enlarged and timbered; the joint California east crosscut has been extended 51 ft.

**UNION CON.**—Are cutting a drain and raising timbers in the joint Sierra Nevada east crosscut. The joint Sierra Nevada east drill hole has been extended 245 ft.

**CON. VIRGINIA.**—On the 2300 level, on the lateral drift, a chamber is being cut out for a raise to the East & Belcher winze, and west crosscut No. 1 has been extended 29 ft.

**CALIFORNIA.**—On the 2500 level the joint Ophir east crosscut has been extended 51 ft; the joint Ophir upraise is being enlarged to the 2300 level, and the joint Con. Virginia west drift to the C. & C. shaft was advanced 34 ft. At the C. & C. shaft they are cutting out a bob station at the 2100 level.

**SIERRA NEVADA.**—On the 2300 level the upraise has been advanced 22 ft; total length, 584 ft. On the 2500 level the north lateral drift has been advanced 45 ft; total length, 600 ft. Ore raised during the week, 273 tons.

**ALTA.**—During the first 34 days of the past week sunk and timbered the shaft 15 ft; total depth, 1,775 ft. In the remaining 34 days excavated a tank station at a point 1,750 ft from the surface; placed a tank therein and also a donkey pump (plunger). Resumed sinking this morning. The water from the Justice causes a great deal of trouble. The pumps are running at 7 strokes per minute. Sump Tank, near Main Tunnel.—During the week repairs were employed repairing the track and cutting out a small sub-drain to drain the water from the track. South Lateral.—Number of ft at last report, 2,664; driven since, 38; total distance from Julia connection, 2,702 ft; total distance in Imperial ground, 362; total distance to Yellow Jacket shaft, 938; nature of ground in the face, soft and swelling; character of rock in the face, decomposed sandstone, with clay seams and no more inches of copper shifts put in 4 sets of timbers, covering 13 ft of ground, which completes the 150 ft of swelling ground commenced Jan. 25th. The repairs were then moved back to the carriage station, 519 ft from the face. From this point, working forward, 120 ft of ground was repaired and timbers cased, and 5 new sets of timbers put in; also, about 300 ft of 15-inch air pipe was placed in position. Thirty-five ft back being cased and set in more inches of water is coming in, but the face is nearly dry. Flow of water in standard gallons per 24 hours, 3,320,000.

**YELLOW JACKET.**—During the past week we have advanced the Suro tunnel drift 80 ft, the face being in very hard ground, requiring no timbering. We are repairing the pump shaft and replacing the 2 defective rods; also, double strapping the pump rod has occupied part of our time.

**SILVER HILL.**—During the past week we have opened our bulkhead on the 900 level for repairs, which gave us so much additional water that we have been obliged to pump into our 380 level. For the last 2 years we have taken most of the Alta and Justice companies' water, for which we have received no compensation. After 2 weeks we will be in condition to pump to the surface, provided satisfactory arrangements are made.

**CON. VIRGINIA.**—Running the pump and making repairs on the 2000 level.

**SAVACOR.**—Relieving timbers and lagging of the Incline and driving on the 2100 level.

**O. & C. AND B. & B. SHAFT.**—Bob pits Nos. 6 and 7 are completed and timbered; working still on Nos. 3 and 4, and making good progress with the work.

**C. N. S. SHAFT.**—During the week another section of hydraulic pipe has been put in. Are leveling off in the 2400 station for pump foundation; leveling the bottom of the cooling pond and cutting a ditch for suction pipe; running both tanks helling water.

**OVERMAN.**—The east drift, 2275 level, has been extended 50 ft; total length, 330 ft; face of drift is in hard black clay. The Forman shaft has been sunk and timbered 5 ft, and sinking suspended to cut station for balance box and pumps. Good progress has been made cutting station.

**BELCHER.**—The timbering of the 10th level tank station was completed Saturday. The old gaskete were replaced by new ones in the compressed air pipe for a distance of about 600 ft during the week. The pump is running at 61 strokes per minute and keeping the water 33 ft below the 2100 level.

**THE PUMPS.**—The pumps have been run on an average of 16 hours per day, consuming 64 cords of wood per day. We are pumping about 3 inches of water for the Belcher company. The Forman shaft has been sunk and timbered 5 ft, and sinking suspended to cut station for balance box and pumps.

##### EUREKA DISTRICT.

**PROSPECT MOUNTAIN MINES.**—*Eureka Sentinel*, Feb. 26: The Deadbroke series of mining claims, consisting of the Deadbroke mine, containing 600 linear ft, has produced from the surface down to the tunnel over 100 tons of ore, consisting of galena and gray carbonates, averaging from \$80 to \$100 silver per ton and 65% lead; also a small percentage of gold. The mine is open through a tunnel 300 ft in length. They have cut the ledge at the distance of 1200 ft, and have connected with the old workings at 225

ft, facilitating ventilation for a greater depth. The total depth from the surface at present is 200 ft; there is about 1,000 ft of work done on the mine. The New Year mine, south of April, adjoining the Deadbroke, contains 800 linear ft, with the same character of ore. The work performed on this mine amounts to about \$1,000. Triangle No. 1 is a location lying east of the Deadbroke and New Year mines. Triangle No. 2 lies west of the New Year and Deadbroke mines, and contains the same character of ore. The Volk and Plauton mines contain 350 ft. This mine is opened by a tunnel 150 ft in length. Its present depth is 140 ft. There have been several tons of choice ore extracted. The nature of the ore is gold quartz, averaging \$240 gold and from \$30 to \$30 silver per ton. All of the above properties are situated on the western slope of Prospect mountain, southerly and westerly of the Williams, Silver Connor and Metamoras mines.

**ORR SHIPMENTS.**—The storms of the past week have seriously interfered with the shipments of custom ore, and about the only mine now sending any ore from Prospect mountain is the old reliable California. With the opening of spring shipments will be resumed.

**WILL START TO-DAY.**—The new machinery of the Albion is now in place, and will be started to-day. It is the most up-to-date battery and has been put in a substantial manner. The mine can now be prospected to a great depth.

**EUREKA CON. PAY DAYS.**—The Eureka Con. will change their pay days this month. The furnace hands will be paid on the 25th; miners on the 27th, and town bills on the 28th. This company discharges between \$70,000 and \$80,000 in this camp every month.

**THIS WILL BE THE LAST.**—The work of prospecting this valuable Prospect mountain property is being actively pushed, and a rich strike on one of the lower levels is reported. This is one of the mines of Eureka district that has paid largely from the grass roots, and it is confidently anticipated that it will soon rank itself among the great bullion producers.

##### TYBO DISTRICT.

**CLOSED DOWN.**—Cor. Eureka Sentinel, Feb. 25: The Tybo Con. M. Co. have closed down both of their mills and mine, which have been running steadily for the past 3 years—on ore taken from the famous 2 O mine, and which has also for two years past kept two furnaces, of 50 tons capacity, steadily running. Still the mine abounds in ore from top to bottom. The engineers and foremen of this property are entitled to great praise for the manner in which its affairs have been conducted, and no accident of any moment has occurred since the starting of the works up to the present time. It is to be hoped that the stoppage of work will be but of short duration, as Tybo has a good reputation as a bullion producer. A rich discovery has just been made in the Snake canyon by E. Mayer, who found a ledge of white quartz from 3 to 8 ft wide, with assays which give from \$50 to \$1,400 per ton. A person can walk on this ledge for a distance of 3 miles. All who have seen the ledge say it is the largest in the State of Nevada. If the new find was only located some 200 miles away it would cause a tremendous stampede, but as it is near at hand nothing of importance is said about it.

##### ARIZONA.

**COAL.**—*Silver Belt*, Feb. 19: Just as we go to press we are shown samples of coal, apparently of fine quality, found within 20 miles of Globe district. The coal is anthracite, and in quantities practically inexhaustible by the present generation. We have time only to say that the bed is accessible to the proposed route of the "Arizona Mineral Belt R. R.," and that Mr. Eddy takes with him East, to-day, a box of specimens for scientific and practical analysis.

**NEW MILL.**—*Phoenix Herald*, Feb. 24: The 5-stamp quartz mill of Jett & Powell, will drop its first stamp about March 10th. The machinery is all on the ground, and the timber is being marked and will arrive in a few days. The mill location is 3 miles north of Phoenix, on the Black canyon road, on the north bank of the Grand canal, which supplies the water. Ore will be brought from the Winfield district, 11 miles, at a cost of \$2 per ton, and as it costs but \$3 at the outside to take it out the ground and run it through the mill, it makes a total cost of \$5 per ton. Two working tests of ore from this district—one at the 2-stamp mill attached to the Phoenix mine, last year yielding \$45, and another of 4 tons at the Gold Hill Con. mill some months ago gave \$28 per ton—show that a very handsome profit is left from the poorest, after deducting the \$5 expense.

##### IDAHO.

**SWAN'S MOUNTAIN.**—*Cor. Idaho World*, Feb. 19: The Rising Star looks fully as well as ever. The ledge is about 2 ft wide and a liberal sprinkling of free gold can be seen in the sulphurates. The indications are that the chimney will hold out for some time yet. The Paymaster tunnel is being driven nine ft per week. The Doctors calculate on having to run 100 or 150 ft to reach the ledge. The North Star shows the best rock of any ledge on the mountain. You can scarcely pick out a piece without finding gold in it. Mr. Plauton has two tunnels. One is already tapped, the ledge 30 or 40 ft below the surface, is now running on the vein. The other will tap it 30 or 40 ft deeper.

**YANKEE FORK.**—*Herald*, Feb. 19: Charles Harris was up from the Yankee Fork gravel company's claims last Monday. He and Wm. Hall and O. R. Drake have a tract of placer ground on the Salmon, 4 miles above the mouth of the Yankee Fork. They are taking it by drifting, and will make a handsome strike as soon as they can wash in the spring. Mr. Harris showed us the prospect from 3 pans of dirt that shows the ground to be rich. The gold is rather coarse, and of a fine quality. There is undoubtedly large tracts of placer ground on the Salmon, and rich placer strikes may be looked for as soon as prospectors branch out in the spring. The Badger tunnel is in 218 ft, and has tapped the ledge, with good prospect for a mine. The tunnel is now being run on the ledge, and work will be pushed as fast as possible, so as to develop and open up the property in good shape for working. The men are not troubled with water in the back end of the tunnel. The water in the Yankee Fork is of a deep red since the starting up of the Custer mill. No more fish need be looked for in that stream. Lovers of salmon should go without their luxury, and eat them shipped in future. Messrs. Robert Orr and Oliver Blanchett are getting along very well with their tunnel contract at the Summit mine. They are now in 70 ft. A good many men are at work in the Custer and Unknown mines.

**EAST OF THE MOUNTAIN.**—Mr. J. W. Hamilton visited Bay Horse on his way home, and went through the Juliet mine, which, he informs us, is 2 ft wide and the ore rich. The Juliet is one of the best mines in the district. Two mines on Squaw creek were lately sold to Boeton capitalists. All the mines in that section have been proven good by development, and lively times are expected soon, as the managers of the smelter have arrived and will start up before long.

##### MONTANA.

**BULLION.**—*Butte Miner*, Feb. 22: The hullion shipment for the week ending Saturday, Feb. 19th, footed up 2,643 lbs, valued at \$40,288. This is considerably lighter than last week, but it is reported that about 1,000 lbs of bullion, not included in the above, is ready for shipment.

**THIS FORMER JURY MAN.**—From Mr. D. D. Budd, in from the Fourth of July district, we learn that that district, although in a snow-bound condition, is not entirely buried with snow. Work on the Fourth of July mine is going on steadily, and the mine is showing up well. A tunnel, run from the ore-house, 180 ft in length, has tapped the vein about 60 ft deep. Levels have been run both ways from the tunnel.

**STEVENS.**—The west side of the Stevens has now reached a depth of 102 ft. The sinking is slow work, on account of water. The shaft is an incline, following the vein down on a dip of about 60°. Three 8-hour shifts are sinking the shaft. The vein, at the bottom of the shaft, is 6 ft wide, 3 ft of which is first-class ore of high grade.

Next week, levels will be started east and west from the shaft that will open up the ore body in shape to stoop out, when the exact extent and richness of the ore can more easily be arrived at. It looks well and prospects well.

**ANSELMO.**—The main shaft still follows the vein, and it has been lowered considerably, with no unusual amount of water. From the levels of this mine the output of rich ore is satisfactory, and the quality up to the figures recently reported.

**HOPK.**—The incline shaft of the Hope mine is being pushed downward daily, and is making fair progress, having now attained a bottoming of 175 ft. Sinking will be continued for a time. No ore is being taken from the levels at present, the work being confined to shaft sinking.

**A LUCIRA.**—Opening work on the Belcher is going on. A well-timbered main shaft, 5 ft 8 inches by 3 ft 8 inches, is going straight down. Much water retards the operation of sinking, which is in tolerable hard granite. It is the intention of the owners to push the shaft down 50 or 75 ft, and then crosscut for the vein, and if the water does not flow in too freely, the Belcher will be again an ore-producing mine.

**NOTES.**—About 80 tons of Allice ore are reduced daily at the mills of that company. All the stamps of both mills are dropping daily. The Mountain Boy, Ophir and Stevens are reported to be in a flattering condition. Most all of the mines worked in Summit Valley district are reported to be looking decidedly well.

**ALICE.**—The ore-faces on the 100, 200, 300, 400 and 500 levels are reported as presenting their usual appearance. Hoisting of ore from these levels continues daily without interruption. The amount of ore lifted from these levels per diem is sufficient to supply both of the 00 and 20-stamp mills, and the amount of ore on the dump-pile, which is huge, remains comparatively intact. Eighty tons per day is about the output of the mine.

**LEXINGTON.**—Work at the Lexington's old incline shaft is steadily pursued. The rich ore chute lately reported holds its own, and the work of extracting ore is now mainly confined to stooping in the 30 level east of the shaft. High-grade milling ore is being hoisted. The new 500-ft double compartment shaft, after having reached, in good shape, a depth of 130 ft, is temporarily stopped. It will be started up again soon, when the steam hoisting and pumping machinery will be put in successful operation.

**MORNING STAR.**—At the Morning Star mine no ore is being hoisted at present. Sinking of the new shaft is prosecuted energetically. Heavy water is being pumped out of the shaft at times, which taxes the pumping capacity of the machinery, but the water is lighter now than heretofore.

**OAGNON.**—Things are running evenly at the Oagnon, where a good-sized pile of rich-looking ore is hoisted daily.

##### NEW MEXICO.

**CENTRAL CITY MINES.**—*Herald and Southwestern*, Feb. 19: On the Henry Woods mine, of Central City district, the owners are now sinking on the main lead and have a good body of fair grade ore. The ledge varies in thickness from 10 to 50 ft. On the Hutchinson mine there is a shaft 45 ft deep, measuring 7 ft by 10, now being sunk. The mine have been put to work and a crosscut, which will strike the metal at the depth of about 50 ft, being run. This mine belongs to H. J. Hutchinson & Co. The well-known San Pablo has a shaft 40 ft deep and a body of ore 4 ft wide. The ore is a sand carbonate, and there can be no doubt that this mine would command a high price, even as at present developed, were there plenty of capital in the country. Smith & George, of Georgetown, have a 75-ft shaft on the mine, and have a large quantity of ore on their dump, assaying well both in gold and silver. The first extension north of the Knickerbocker is known as the Pius IX. Work on this mine was commenced about 10 days since, and the shaft, at the depth of 10 ft, shows a 4-ft vein of fine smelting ore, samples of which can be seen at Sam's saloon, in this city. A number of other claims are being worked with good results.

##### OREGON.

**THE MONUMENTAL.**—*Bedrock Democrat*, Feb. 16: A correspondent writes thus of this valuable mining property: The mill is still running on the rich ore, and the ore continues to be mined away until the end of March. The ore is being splendidly—yielding \$1,000 every 24 hours. When the mill shuts down in March a wagon load of silver bullion will find its way to Baker, where it will be freely circulated by several of our Baker boys now employed here.

**THE TOM PAYNE MINE.**—Several reliable persons visited the celebrated Tom Payne mine last week, situated about 8 miles from this city, in Polk county district. They reported the owners, Hayes & Co., thoroughly developing it, and the mine is now producing rich ore ready for crushing. From all appearances the ledge is a true feature vein with a tendency to widening the further they sink on it. We are glad to hear such cheering news from this mine, and shall entertain great expectations of it the coming summer.

**NOTES.**—*Oregon Sentinel*, Feb. 19: Work is going steadily on in the Schnapp tunnel, near Willow Springs. The Applegate hydraulic mining company are again piping, having repaired their ditch. All the large Oaile creek claims are running again with full heads of water. Berryman & Co. are drifting on Applegate and realizing \$8 per day to the hand. Every claim in the Willow Springs camp is being worked on full time and water plenty. Cook & Anderson have struck good pay on Prairie fire, but the water is not expected to last long. Frank Town, of Sterling, says there never was a better prospect for a suitor than there is at present. Sam Luckend, Supt. of the Star Gulch hydraulic mine, is moving large quantities of dirt, utilizing his water every hour during the day and night. Tom Kahler has been picking up "chunks" in the claim of McDougough, Kahler & Co. at Fort Laugarain. Last Sunday he picked up one worth \$25. Mr. Williams, of Pleasant creek, tells us that the shaft was done in the camp by the stamper, and that miners are generally busy making the most of the water. Dessels & Co., on Scott gulch, Josephine county, have not been using their elevator since the commencement of the storm, having been using their water to better advantage.

##### UTAH.

**LITTLE COTTONWOOD.**—*Cor. Salt Lake Tribune*, Feb. 10: The following mines will be in active operation this season besides many others on a smaller scale: The Flagstaff group, consisting of the Flagstaff, South Star and Titus, Virginia and Nahoh, will employ a large lot of men. The American Emma, having all its difficulties settled, will start up with ponderous machinery and every available facility to make it, as before, rank as one of the leading mining properties on the coast. The Joah Lawrence, of course, will resume its former title as one of the leading ore producing mines, and employ a large force of men. Joe Mariou says the Rough & Ready mine is the boss of the hill and only requires developing, which he will do the coming spring. It already has a fine vein of high grade ore. The Buffalo, McKay, Little Cottonwood tunnel and Mand are only waiting for spring, when active operations may make the most of the water. Dessels & Co., on Scott gulch, Josephine county, have not been using their elevator since the commencement of the storm, having been using their water to better advantage.

**A LARGE DROP HAMMER.**—weighing 1,500 lbs., was cast at the Sweepstake Factory, San Leandro, two weeks ago. The hammer is one of the largest in the State, and will be used in the new shop at Benicia.



### The Mining Outlook in New Mexico.

The mining outlook in New Mexico is at the present time better than ever before, and during the coming year we look for much active work in the new districts. Gold, silver, copper and lead are being found in all directions, and the excitement reminds one of the early days in the older States. To the south of us the White Oaks are receiving a great deal of attention, and mills and smelters are being constructed to work the ores of that camp. At the Magdelenas a smelter is completed and ready for operations. At Socorro the mines are looking well, and several large sales have recently been reported. The reports of the riches of the Black Hills, the Mogollons, the Santa Ritas and other points, are being sent abroad by returning prospectors, and are attracting the attention of many. At Shakespear the ore is improving, and a mill is already projected. The Lone Mountain district is producing good ore, and the Carrollton mill will be erected there. The Mimbre company have a large mill at Georgetown ready for operations. The mines about Silver City continue their regular shipments of bullion, and this fact is inducing some to visit that point. In Taos county many are turning their attention to prospecting who never before gave it a thought, and some encouraging reports have reached us from there.

In Colfax county not much is being done. The Rebel Chief mine is working a force of men, and a sufficient body of ore is now exposed to warrant the erection of a mill; machinery for which was recently ordered from New York. Other mines in the county are just as valuable as the Rebel Chief, and all that is required is the capital rightly expended to develop and work them to place quite a number on a paying basis. Many men will visit us during the coming summer for the purpose of investing their surplus capital, and mine owners should clean out their old tunnels and shafts and be ready to exhibit their properties to all intending purchasers.—*News and Press.*

### San Francisco Harbor.

#### The Government Engineer's Report.

The Secretary of War has transmitted to the House of Representatives an elaborate and highly interesting report prepared by Colonel George H. Mendell, of the United States Engineering Corps, in response to Horace Davis' resolution calling for information as to all causes tending to diminish the tidal area of San Francisco bay and lessen the tidal scour on the bar, and thereby decrease the depth of water on said bar, and diminish the value of San Francisco as a commercial harbor. Colonel Mendell first specifies the natural causes which are practically not subject to control. He describes the drainage system of the rivers emptying into San Francisco bay, and shows how the rapid fall of their tributaries and violence of the rains favor the erosion and transportation of earthy matter from the mountains, and the steady conversion of marshes into dry land. The present extent of marshes in San Francisco bay, including Suisun and San Pablo bays, is stated at 300 square miles. Mention is next made of similar tendencies of

#### Hydraulic Mining.

The report then proceeds to consider the artificial causes, such as the construction of piers and jetties, and the utilization of State and city grants of submerged lands. Referring to the pier and training walls at Oakland, Colonel Mendell says: "The tendency of these structures is to hold the material deposited along the shore, and, therefore, to concentrate in a small area that which otherwise would have been distributed over larger areas. This effect can never take great dimensions." He reports, in regard to the apprehended shoaling of the bar outside the entrance to San Francisco bay, that a comparison of the survey made in 1855 with one last made in 1873 shows that the bar has not retreated and that the depth of water on its crest has not been diminished. He therefore says it is safe to state that the bar was as good in 1873 as in 1855. No survey has been made since 1873. After discussing various

#### Features of the Problem

Suggested, Colonel Mendell concludes his report as follows: "The foregoing description of the bar demonstrates that it is able to lose a great part of its advantages and yet remain an admirable channel for commercial purposes. At present this channel is 11 miles wide. If we suppose the bar to move shoreward until it is shortened to half its present length, it is apparent that a largely diminished tidal prism might be able to maintain, over the shorter line, the depth that it now maintains over a longer. The depth of the crest might be reduced to much narrower limits than the one last named and yet remain an excellent channel, and be maintained by a tidal area, only a small fraction of which now contributes to this result. If we suppose the crest of the bar to maintain its present position, instead of retreating, the effect would be

#### A Diminished Channel,

Resulting from filling the interior of the bays, to encourage the growth of existing shoals, and to form new shoals. These shoals would shorten the crest, and lessen the area of the channels to be maintained. The result would be practically equivalent to that to be produced by the retreat of the bar shoreward, and between these shoals one or more channels would remain. The access to the harbor under these circumstances, although far inferior to the pres-

ent conditions of convenience, might still compare favorably with the approaches to many of the great commercial ports of the world. It appears to be inevitable that this interior hays must continue to loss in area. The force of gravity works incessantly to that end. There is no compensation in any other natural force. The commercial necessities are in the same direction. Nature and man seem to be under a common necessity to lessen the tidal areas. Yet the ultimate disaster appears to be remote in the future. We are not, however, on that account delivered from obligations to counteract these tendencies, nor are we powerless to do so in some degree." Col. Mendell proceeds to indicate what steps should be taken.

#### Without further Delay,

And means of accurately determining upon the best remedial immediately afterwards. "He recommends that a new survey of the bar be made forthwith, and that periodical surveys, both of the bar and of the shoals about the bay, be provided for. Another subject for investigation is the relative scouring value of equal quantities of water stored in different parts of the great bay. This, he says, would indicate some measure of the consequences to follow from the loss of the lower part of the tidal prism of Suisun bay, a result that may be near at hand. He adds: There seems to be some ground for the opinion that the bar would not be greatly affected by this result. The influence of hydraulic mining, as compared with what may be called natural influences, would, of course, be an available topic for study in this connection, as mining is subject to control. The question as to what extent the owners of submerged lands should be allowed to fill, is also important. These are not questions that can be solved in a day, or a year. During the period given to the investigations thus outlined, other points of inquiry will suggest themselves, and in due time information will be obtained sufficiently to demonstrate the soundness or unsoundness of the deductions now drawn from incomplete existing data.

### Design Patents.

Although the government has for several years granted patents for designs, the question of what constituted an improvement of "design patents" has not until recently been settled. In fact, the legal rights of the owners of this class of patents were not very well understood; that is the absolute right of such members had since been sufficiently defined. A suit which commenced over a year, was commenced by James W. & Isaac M. Miller, of Newark, N. J., to determine their rights to certain "designs" in jewelry, and the decision made by the court is of great interest to owners of this class of patents.

Justice Clifford, of the Supreme Court of the United States, delivered the opinion, which declares that patents for designs, as well as for machines, are authorized by the act of Congress, and that a design patent is something that the law protects, and that the trade must respect. In decisive language, the court determines the case in favor of Miller Bros., on all points, awarding a perpetual injunction, and an accounting of profits, and an assessment of damages against Albert J. Smith and Dutes Wilcox, of Providence, R. I., the defendants, and makes all jewelers, whether wholesalers or retailers, who have sold the infringing goods, liable for damages. This test case has received widespread attention from the jewelry fraternity generally, and "design patents" may now be regarded as "good for something," and "infringement" as a dangerous and unprofitable business. It needs only a sharp application of the law as laid down and defined by this eminent Judge of the Supreme Court to secure hereafter inventors and patentees of original and useful designs against the unscrupulous piracy from which they have so long suffered. The importance of the decision in its encouragement to inventors, and will appreciate, as protection is an incentive to the best efforts of skill in this as well as in every other field of productive industry and necessity, to bring our American manufactures to the highest degree of advancement and prosperity.

**THREE GREAT MINES.**—A Tombstone correspondent says: I think Tombstone has got three of the greatest mines on the coast for their age and development. The principal of these is the Toughnut which is running 25 stamps and shipping about \$180,000 per month. The mill is situated ten miles from here on the San Pedro river. The Contention is working about 60 men; it has 25 stamps also and ships about the same amount of bullion per month. But the Grand Central is the young giant of them all. It certainly is the finest mine in the district. About 6,000 tons of ore is now lying on the dump, all of which has been taken out of the mine while opening it. The company is building a 30-stamp mill which will be in running order about the middle of February. Then you will see the greatest bullion-producing camp on the entire coast. There are a number of fine prospects in and around Tombstone which will shortly come to the front.

**THIRTY-SEVEN** Leadville mines employ 2,097 miners and 144 teams, and \$230,700 are required monthly for wages. Thirteen mines have paid \$6,000,212 in dividends in the past year, or more, after paying their previous owners \$5,697,321 besides, and having \$920,000 cash on hand now.

### Improved Telegraphy.

An exhibition of what is known as the "House Postal Telegraph System" was given yesterday afternoon at the residence of the inventor, Mr. Royal E. House, No 83 State street, Brooklyn. The exhibition was well attended and considerable interest was manifested in the invention by those present. Mr. House was the inventor of the telegraph system used by the first telegraph company, out of which the Western Union company grew. By the system exhibited yesterday it is claimed that from 250 to 300 words a minute can be automatically transmitted, received and printed in ordinary type ready for delivery. It has been so perfected that the message can be received without the presence of an operator and transmitted at one-tenth of the present cost of transmission by the Morse system, not only in the matter of labor, but also in the number of wires used. Three machines are required to do the work.

Machine No. 1 is about the same size as the type writer and somewhat similar. There is attached to it a fillet of paper, and as the operator who receives the messages operates upon the machine, this slip of paper passes over two small lance-pointed knives, which strike it from below, cutting in it a slit each time of striking. These slits are alternate, parallel one to the other. Each slit represents a letter of the alphabet, the shortest slit standing for those letters most frequently used. The fillet of paper is then taken to machine No. 2, which is automatic in its action, and in which the power of electricity is used. As the paper passes through this machine an exact counterpart is made at the receiving station, recorded automatically. Machine No. 3—an automatic printing machine—prints the message in plain type as the fillet of paper passes through it. By an attachment to the receiving machine any station on the line can be called in automatically and thrown out without the presence of an operator. It is said that by this system only two operators will be required in transmitting a message from this city to Philadelphia, while at present a dispatch has to pass through about six hands.—*N. Y. Herald.*

**NEW CHLORINATION WORKS.**—Mr. Jas. M. White, the gentleman who superintended the erection of the furnaces at the Iron mine, says the Placer Herald, having a few months respite from duty in connection with those works, is improving the time thus afforded by erecting on his own account chlorine works, for the reduction of the sulphurets which accumulate in greater or less quantities at the quartz mill in this locality, and which heretofore it has been the practice to send away for reduction. He has selected a point on the tramline known as the Poland Flat, about a mile below Auburn, for the location, which, being a fair compromise between Auburn and Ophir districts, and easy of access, is thought to be very favorable. He has the necessary buildings well under way, and will commence at once to put in the furnaces. The importance of such works in this locality has often been discussed by our miners, and the favorable inducements from a business point of view to any who would undertake their erection, conceded. Mr. White is the one who steps in to fill the opening, to supply what is recognized to be a want, and we trust he will receive that encouragement from the miners and mill men that his enterprise deserves; and we may venture the hope, coupled with the belief, that as a business venture it will prove a success to its projector and a benefit to the community.

**RAILROAD CONSTRUCTION DURING 1880.**—The reading public are indebted to the *Railroad Gazette* for an interesting annual statement of railroad construction for 1880. It appears from this that the total mileage was 7,150, which is greater than for any year since 1872, when it was 7,340, that year being the culmination of a period of great energy and enterprise. During 1880 Dakota must be credited with the greatest activity (724) in new enterprises. Texas comes next (653), and then Ohio (500); Iowa is credited with 456, Kansas 363, Missouri 312, Nebraska 377, and Wisconsin 26. Since 1872, when the previous railroad building era culminated, only Texas, Iowa and Kansas have built more railroad than Ohio, as will appear from the following table, which shows the number of miles of railroad completed in each State that has built more than 1,000 miles in the eight years from 1871 to 1880, inclusive:

Texas.....	2,643	California.....	1,107
Iowa.....	1,730	Illinois.....	1,093
Kansas.....	1,550	Colorado.....	1,077
Ohio.....	1,393	Oakota.....	1,069
Minnesota.....	1,244	New York.....	1,065
Missouri.....	1,191	Wisconsin.....	1,037
Pennsylvania.....	1,123	Indiana.....	1,012

**POOR MINE MANAGEMENT.**—The Leadville Circular speaks of that district as follows: "This camp may be said in one sense to be wobbling. The number of pay mines has been doubled within a year, but the number of competent mine managers has not increased. One-half of the mines are being managed by men who hardly know porphyry from quartzite. Five-tenths of the mines have not been examined for six months by a disinterested expert. The owners really know nothing about them. They conduct their business as if it was a faro-bank gambling, and then they complain when they lose. Everyone who owns a substantial interest in a mine should have it examined by some one he can trust, who is not connected with the management, at least once every three months."

### California Petroleum.

In our issue of Feb. 12th, we gave at length a record of the year's work of California in the petroleum fields. The petroleum interests of California are much greater than most people suppose. The considerable region of southern California, which gives great promise of developing into an oil-producing section of vast productiveness, invites the attention of the public. It is a matter of deep interest to know whether the oil held is to be relied on as an important accessory of our successor to the Pennsylvania field. It is of interest, not only to California, but to all parts of the country. Citizens of Los Angeles, Ventura and Santa Barbara counties are numerous signing a petition to Clarence King, Director of the Geological Survey, directing his attention to the petroleum region in the counties named, and to the work of development prosecuted there since 1865. They say:

We represent that outcroppings of petroleum are found along the line of a belt of shale, about 80 miles in length, extending from the San Fernando district in Los Angeles county through the "Seespe," "Santa Paula," "Ojai" and "Sulphur Mountain" districts in Ventura county and the "Carpenteria" and "Santa Barbara" districts and terminating in the Pacific ocean off the asphaltum mines at "Goleta" in Santa Barbara county; that the remarkable and innumerable exudations of oil, and other encouraging indications which occur along this belt of shale have induced many of our citizens, and the citizens of other States, to engage in the work of prospecting and developing this region for the production of petroleum; that such work has been prosecuted without the aid or guidance of any thorough or reliable scientific investigation, and has involved the expenditure of an immense amount of labor and a million dollars in money with practical results, which are generally unsatisfactory and discouraging, which will probably be of sufficient aid to the geologist after a survey of the region in arriving at conclusions relative to the probable productiveness of the region which will be of most important practical use.

That the uncertainties and risks which attend the work of development in this region are excessive as compared with those which are incident to such work in Pennsylvania, owing to the difficulty to comprehend its geological construction and features, and to the peculiar difficulties experienced in boring wells.

The practical operators and capitalists familiar with the subject, unite in the opinion that the results of their work strongly tend to prove that large quantities of petroleum of good quality exist, and probably can be obtained in this region, but the uncertainties and risks referred to will discourage them from continuing or enlarging their operations, until they can have other and better guidance than their experience supplies.

Petroleum exists in many parts of this State, and the hope is indulged that in time not only our home market in the Pacific States and Territories, but Australia, China, Japan, British Columbia, Mexico, Central America and South American countries on the Pacific seaboard, will be all supplied with the product of these oil regions; but at present the petroleum district which we have mentioned and described, owing to the frequent exposure of geological structure, and to the superior importance of the developments already made, and its proximity to the ocean, which offers cheap transportation for the product, presents more attractive features to the capitalists, and offers more incentives for practical operations, and more data for scientific inquiry, than any other.

Wherefore, as the material interests of the country, which your survey is so well designed to develop, would be greatly promoted by the successful solution of the problem which is here suggested, we respectfully ask that a geological survey be made of the oil belt above described, under your direction and at the public expense, to determine the general character and extent of the oil-bearing rocks of that region; and in some district, which to you may seem most important and promising of desired results, to determine the legal stratigraphy, sufficiently accurate to enable the prospecting and development of the territory to be intelligently resumed.

**AN OLD PROSPECTOR GONE.**—Charley Stormes was shot and instantly killed at Tombstone, Arizona, on the 25th ult. Stormes was about 60 years of age and married. He came to this coast at an early day, in the flush time of '49; was well known throughout the Pacific coast, and wherever known, he was always liked. He had traveled extensively, had seen much of man and manners, was a genial companion and firm friend. He had followed all the excitements on the coast from Gold Lake to White Pine, making, however, his headquarters in this city. About a year ago Stormes left San Francisco for Leadville, Colorado, and from there traveled through New Mexico, finally bringing up at Tombstone, where he remained until his death. But little is known of Shaw, the man who killed Stormes. He is a native of Denver, and is said to be a desperate character. The trouble which led to the homicide is supposed to be founded on some gambling transaction.

It is said the postal card has decreased the sale of writing paper \$12,000,000 annually in the United States.



## THE ENGINEER.

## Steam on Canals.

The Belgian towing system does not seem to work well on the Erie canal. One hundred and eight miles of wire has been used during the past season. The wire has only been used by a portion of the traffic, horses having been employed, as in past years, for most of the towing.

The principal difficulty in the way of successful navigation by the system is in the sharp curves or bends of the canal itself. On straight portions it cannot be said to have done much damage, except in occasional instances; but abundant testimony is to be found of its destructiveness upon the canal banks at all points where short bends occur. At these points, the cable, instead of being in the center of the canal, is always hard to shore on the short side of the bend, and is frequently left on top of the tow-path or berm bank, as this case may be. In consequence of this, when the cable is picked up by the cable tug, the tug is forced hard to shore, and has the greatest difficulty in passing the bend, the tug and tow raking hard on shore, putting off docking, masonry, stone from slope walls, earth, sods, gravel, and causing them to fall into the canal.

Under the present arrangements the two systems work very inharmoniously. The dangers and difficulties of navigating the canal with boats towed by cable and horses are very great; one must give way to the other in every instance, and this the cable company refuses to do. It is fair to suppose that, as the cable system was intended for the use and convenience of boatmen, they would be quick to see its advantages. Two of the principal points which the cable company make are gain in time and cheapness in towing. Both of these they have failed to accomplish. These points are of vital importance to the boatmen; but after the past season's experience their almost unanimous opinion is that the disadvantages far outweigh the advantages.

**RAILROAD EXTENSION IN THE MISSISSIPPI VALLEY.**—The progressing and projected railroad extensions in Ohio, Indiana and Illinois will perfect the railroad systems of those States and largely increase the capacity of the system for business. The resulting competition which may be expected will give very reasonable rates for transportation. One hundred miles of road are being added to the Lake Shore and Michigan southern system, connecting Toledo with Chesterton, Indiana. The Indiana, Bloomington and Western Co. will complete the gap from Indianapolis to Columbus. The Chicago, Burlington and Quincy are making connections which will enable it to compete for Paubandle traffic. Articles of incorporation have been made for several other roads and extensions, which, when completed, will give a symmetry to the disjointed system which has grown up out of necessity.

**PROGRESS OF THE GREAT NEW YORK BRIDGE.**—The first of the heavy steel beams for the superstructure of the East river bridge have been received. The four great cables to be placed under the floor of the bridge from tower to tower, to strengthen the bridge against upward and lateral wind pressures, have also been received. They are regarded as the largest steel wire ropes ever made in this country. These ropes are made in seven strands each, 1,550 ft. in length and three inches in diameter. Every wire put in these and all ropes used in the bridge is tested in strength, elasticity and tension. The strength must equal 160,000 lbs. per square inch cross section. The strength must be not less than 4%, and the wire must stand being wound around an iron rod three times its own diameter without showing flaw or fracture.

**A GREAT DRAINAGE PROJECT.**—It is reported from Florida that an agreement has been entered into between the State authorities and certain Northern and Western capitalists to drain Lake Okechobee and the great swamp region southward known as the Everglades. The lake is about 30 miles by 40, and the entire area to be reclaimed is nearly twice as large as the State of New Jersey. The projectors claim that the drained land will make the best sugar country in the world. How they propose to accomplish the work is not stated. So long as the South has so much waste land suitable for sugar growing, without drainage, an undertaking of the sort described would seem to be rather speculative than practical.

**THE Harbor River Tunnel Enterprise** having fully recovered from the shock of the disaster of July last is now being pushed with renewed enterprise, and the work is approaching the New York shore at the rate of five ft. per day. The present system of working is a modification of that first adopted. While it is much more safe it is also said to be conducive to more rapid working, without any material increase in cost per running foot. Work on the New York shore will commence at an early date, and when the south tunnel, which is now alone being excavated, and has reached a distance of 150 ft. from the shaft, is brought as far as the north tunnel, both can be prosecuted simultaneously.

In the Arizona Legislature, the house has passed a bill repealing the tax on the net proceeds of the mines.

## USEFUL INFORMATION.

## Oil of Coffee.

From a paper upon the oil of roasted coffee, contributed to a chemical journal by Dr. C. O. Cech, of St. Petersburg, we condense the following:

Although the coffee bean belongs to our daily food, we are still uncertain of the chemical nature and composition of the products of roasting coffee, and of oil of coffee, one of the important characteristic constituents of the bean.

The existence of a coffee oil makes itself known in a striking manner by its roasting, for this oil, driven out of the beans by the heat, is partially volatilized, and, together with other products of the roasting, produces the characteristic aroma of roasted coffee, an odor possessed by no other substance. In very strong hiack coffee, too, we can see this oil like little drops of grease floating on it. The amount of oil in coffee varies from 8 to 13%, and at least half of this is lost in roasting, so that it would be a paying experiment to attempt to collect this oil, especially in large establishments where much coffee is burned and several pounds of oil are dissipated daily.

An effort to this end was recently made by Dr. Cech, which demonstrated that it was practical to save this oil in large establishments. At first there is scarcely any gas generated; but after the beans are browned and the whole mass has been heated to the temperature where the oil evaporates, such a quantity of the volatile aromatic oil is generated that it trickles down the walls of the chamber in which the beans are shoveled and cooled after coming from the drums.

Practice has proven that the very moment when the beans turn brown, the vapors of oil begin to pass off. If the heat at this moment is increased, the beans will be rapidly reduced to charcoal or take fire and be consumed. Cech has no doubt that the oil of coffee would find profitable use. The beans experimented on by him were not of equal value as regards the yield of oil, for while some contained as high as 13%, other kinds fell below 8%.

The oil of coffee is a green, thick, transparent oil, and after some time a few long needles were deposited from it. These proved to be caffeine. The coffee oil became turbid in half a year, although it was kept in hermetically closed bottles. Small groups of crystals were formed in the middle of the liquid, and slowly settled to the bottom, and at the end of three years the bottle was two-thirds full of a dirty mass of crystals consisting of the solid, fatty acids, but the upper layer of the liquid remained for years transparent, clear, and of a beautiful green color, proving that a portion of coffee oil consists of liquid oleic acid.

Although Dr. Cech has had the oil in his possession for three years, he has not determined its percentage composition.

## Curiosities of the Census.

The prying genius of the census taken often brings to light some very curious things. The Brooklyn (N. Y.), census superintendent discovered, among other things, that Jamaica Rum was Made From Old Shoes in that city. He was much puzzled, in his official duties, upon discovering that there was some use made of old shoes, which was not known to any of the deputies in his employ, and could not be discovered. It was found that old shoes were collected in large quantities by rag-pickers and junkmen, and sold to certain mysterious persons, for what purpose no one could divine. It was well known that Prussian blue is made of old leather, but the persons engaged in that business were perfectly willing to have their works inspected. After much inquiry and investigation, it was found that the old shoes were made into Jamaica rum. When they came from the rag-pickers, the good pieces were cut out and sold to small cobblers for patching purposes. The rest was distilled with spirits, colored with burned sugar and sold as Jamaica rum, and the most singular fact about the business is that it is bought, not by saloon-keepers, but by druggists who pride themselves on the purity of their articles.

## Tomato Catsup from Canning Waste.

Many industries were found in which, though the value of the product was considerable, no value was attributed to the raw material. One man who made tomato catsup acknowledged to making \$18,000 worth of catsup every year, but said that the raw material cost nothing. When pressed for an explanation, he said he sent to the factories where tomatoes are canned, big tubs, into which the peelings and trimmings of the tomatoes were thrown by the man who prepared them for canning. This material he got for the trouble of carrying it away. He ground it up, flavored it, and sold it as catsup to the extent of \$18,000 a year.

**GOOD FOR BANK PAPER.**—A French paper-maker recently tried an experiment in the manufacture of his paper, by which he introduced a sufficient amount of ultramarine green to give it a delicate green tint. After the paper was finished and lithographed like a bank draft, it was written upon with a slightly acidulated ink, the writing appearing in a clear, plain, white streak upon a light green ground. It would seemingly furnish excellent protection against tampering.

## Lead Pipes Destroyed by Mortar and Cement.

In German cities, where the streets are not decorated by festoons of telegraph wires strung upon towering masts like a dismantled forest, but securely buried in leaden pipes, the telegraphic cables are out of sight and protected from ice and fire, some interesting experience has been gained. On taking up these cables it has been found that in some places the lead pipe had become brittle and porous, and a chemical examination showed that the lead had been converted into a basic carbonate (white lead). It was found that this change had taken place only where the pipe had come in contact with mortar or cement.

Dr. Rossel, who has experimented with lead, finds that in contact with lime mortar it always loses perceptibility in weight, and in contact with cement the loss is nearly as great. Lead buried in moist earth that contains chlorides, saltpeter and sal ammoniac, lost weight, but to a much less degree than in mortar. The sulphates, like plaster of Paris and Glauber salts, had no action upon lead; neither did the carbonates, like chalk, soda and potash, nor the silicates, sand and clay. He calculates that a pipe one millimeter thick, or one twenty-fifth of an inch, might be eaten through in 15 or 16 months.

[We have ourselves seen lead pipe destroyed by holes and indentations on the outside as if bored by an insect, but were unable to ascertain the nature of the soil where it had lain.—Ed.]

From his observations Dr. Rossel makes the following statement:

1. Lead pipes should never be brought in contact with any sort of mortar or cement.
2. Clay does not attack lead pipe if free from sal ammoniac and saltpeter, the latter resulting from the decay of organic matter.
3. Plaster of Paris offers the best protection for lead pipes. Wherever lead pipes pass through a wall they should be laid in gypsum, over which mortar or cement can then be safely laid.—Scientific American.

**GENIUS, MONEY AND LABOR.**—Tennyson can take a worthless sheet of paper and by writing a poem on it make it worth \$5,000. That's genius. Mr. Vanderbilt can write fewer words on a similar sheet and make it worth \$50,000,000. That's capital. And the United States Government can take an ounce and a quarter of gold and stamp upon it an "Eagle-bird" and "Twenty Dollars." That's money. The mechanic can take the material worth \$50 and make it into a watch worth \$100. That's skill. The merchant can take an article worth 25 cents and sell it to you for \$100. That's business. A lady can purchase a comfortable bonnet for \$10, but prefers to pay \$100 for one, because it is more stylish. That's foolishness. The ditch-digger works 10 hours a day and shovels out three or four tons of earth for \$1. That's labor.

## GOOD HEALTH.

## The Growth and Development of a Child

The *Medical Record* reproduces the leading features of the studies of Prof. W. Preyer of Jena, in a field as yet quite unbroken, that is, in the psychological study of infants. This study begins, the Professor says, with the observation of the movements and sensations of a child, and then proceeds to note the developments of the different senses, the formation of speech, etc., and the effect of all these things in awakening the intelligence. The first manifestation of voluntary motion occurs about the 14th week, when the infant begins to hold up its head. After four months the head is usually balanced well, and at 10 months the power to sit up is acquired. Ability to stand was usually, in the cases studied by the Professor, gained suddenly at the end of the first year. The first grasping motion of the hand in the first quarter year are entirely reflex and mechanical, the first voluntary attempt to take hold of an object not being noticed before the 17th week. A child does not show self-consciousness, a knowledge of its independent existence, until the second quarter of the second year.

The sensibility of the skin of a new-born child is very low, and it will give no signs of discomfort if it be pricked on the nose or lips or hands. The eyes, too, close slowly when touched, and do not close at all in the bath. An increase of sensibility, however, appears in a day or two after birth. All infants are deaf at birth, because the outer ear is closed and there is as yet no air in the middle ear. A response to a strong sound is observed, at the earliest, in six hours, but often not for a day or two. The awakening of the sense may be detected by the blinking which a loud noise occasions. No other organ is thought to contribute to the intellectual development of the child so much as the ear. The first perceptions are those of light. The infant shuts its eyes as soon as the light enters them; within a week it turns its glance to the window, but it is three weeks before the eyes will follow a light moved before them.

The stupid expression on the child's face does not leave it until the second quarter year, and the face grows more human and spirited with the increase of the power of seeing intelligently.

The power to distinguish colors follows that of intelligent attention, and light and bright colors are preferred; but the power to distinguish them by name does not come until the beginning of the third year. The recognition of form, size and distance comes slowly. In the first month the infant pays no attention to the swiftest approach of the person's hand to its face, and in the third year it will still show ignorance of size and no appreciation of distance.

The Professor set down in writing every sound uttered by a child during its first two years, and which could be so represented. At first only vowels are heard, but even in the first five weeks these sounds are so diversified as to express different feelings. Thus, the Professor says, the periodically broken cry, with knit eyes, denotes hunger; the continuous whine, cold, and the high, penetrating tone, pain. The consonant m was heard in the seventh week, and in the seventh month b, d, n, v, and, rarely, g, h and k were distinguished. Imperfect imitations of sound were heard in the sixth month, and at this time voices began to be distinguished by the child. Great progress is made in the imitation of sounds after the third half year, and the powers of articulation become well developed by the fourth half year.

## The Composition of Serpents' Venom.

What a wonderful thing the venom of a serpent is! Chemical analysis fails to detect anything in it to account for its action. Water, a little albumen, some mineral salts, and traces of mucus, epithelial cells, etc., lumped together as "extractive." Nothing more—nothing specific about it at all. Tasteless, colorless, and odorless, it may be rubbed on the sound skin, or applied to the eye, or taken into the mouth without any result whatever. The bites of different kinds of snakes produce different effects; some act as a depressant to the vascular system, some as a powerful narcotic, some cause inflammation of the spine, while others seem to give rise to disorganization of the structural constituents of the blood. All are attended more or less with rigors, delirium, syncope, convulsions, paralysis, and coma. Whether the poisons of any two or more species are identical I do not know—it seems probable; but in the five species with which I have experimented on myself, so far I have found five distinct and separate venoms. I imagine, for instance, that the rattlesnake and copperhead will prove to possess the same and perhaps several of the viperine snakes. I hope so.

Some of these fluids are very unstable, and decompose if kept only a short time, or if their specific gravity is disturbed, while others retain their deadly properties even when dried. That of the common French viper (*Vipera aspis*) may be diluted down till it forms a mere local irritant. No true antidote has ever been discovered for the bite of any snake, and the search for something which shall be an antidote against the bite of all, appears to me to be irrational in the extreme, seeing that there are so many different poisons, producing, in many cases, opposite effects. One might as well expect to find a general antidote for opium, belladonna, strychnine, arsenic, and mercury poisoning. The action of ammonia, upon which so much stress has been laid, is probably nothing more than that of a strong stimulant; certainly its action in maintaining the fluidity of the blood is quite hypothetical, seeing that premature coagulation of the fibrine has never been actually demonstrated. Indeed, it is said that at the autopsy of the keeper Girling, bitten many years ago by a cobra de capello at the Gardens, the blood formed no clot at all, but was found permanently fluid in all the great vessels.—*Land and Water*.

**SALICYLIC ACID FOR BEE STINGS.**—Although salicylic acid, from having been too highly extolled, has fallen somewhat into disfavor, there can be no doubt that it is useful in the case of bee stings. An Austrian paper recommends the following treatment: First, to remove the sting as quickly as possible with a forceps or by scratching with a finger, but never between the thumb and forefinger, because this equezes more of the poison into the wound. Next squeeze the wound until a drop of blood comes out, and rub the place as large as a dollar with an aqueous or dilute alcoholic solution of salicylic acid. The effect is still better by injecting the salicylic acid into the wound with the hypodermic syringe. After this the spot is painted with collodion to keep out the air. A sting treated thus causes little or no pain, slight inflammation and swelling, and is not followed by nettle-fever or lameness in the most sensitive and nervous individuals.

The cause of malarial fever is ascribed by Messrs. Tomassi and Klebs, to the presence in the atmosphere and in the soil of an infected district, of a microscopic fungus consisting of movable shining oval spores, which they have succeeded in detecting and identifying. To test the accuracy of their observation, the fungus was injected under the skin of dogs, with the result that the animals impregnated with the poison manifested unmistakable symptoms of malarial fever, with intervals of repose for 16 hours, elevation of temperature to 107.6° Fahr., and enlargement of the spleen, in which, as well as in the lymphatic vessels, a large amount of the fungus in its characteristic form was observed. The authors propose to name this fungus *Bacillus malarie*.





W. B. EWER..... SENIOR EDITOR.

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## Business Announcements.

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## The Week.

The talked-of event of the week has been the final decision, by this Legislature that the debris bill shall not be repealed. This question has overshadowed all others during the session, and there has been a great deal of hard feeling engendered among the opposing factions, who have arrayed the miners and farmers against each other. For a time at least the matter is now settled and opportunity will be given to more thoroughly test the brush-dam system of impounding the debris. If it shall be found to be inadequate, there will be no difficulty next time in changing the present arrangement, while if it is successful, as hoped, a partial solution, at least, of the problem will have been made. Of course, this experiment, like all others, is an expensive one, but not out of proportion to the great interests involved.

As the days lengthen and spring approaches, the prospectors begin to think of the approaching season. Already preparations are being made by various parties to take the field in new regions. Most of the miners are looking south, but some of them have their thoughts turned northward.

The fine weather has made water plentiful in the gulches and ravines, which has been good for surface miners. The mining news from various parts of the coast show great activity. On the Comstock, however, very dull times prevail, and if no bonanzas are uncovered, they must become worse. The mining companies and the men are still engaged in discussing the miners' wages question, and in such a spirit that doubtless a satisfactory solution will soon be gained.

## A Gold and Silver Institute.

It seems somewhat strange that after over a quarter of a century's experience in gold and silver mining on this coast, we have as yet no institute, society or association devoted to the great interests of gold and silver mining. There are in the East iron and steel institutes, coal institutes, an institute of mining engineers where matters connected mainly with coal and iron mining are discussed, and similar organizations. But here we have no organization of any kind where persons of kindred interests in these subjects, are banded together for mutual benefit, improvement, instruction and advancement.

Our only mining associations are miners' unions, to keep up scales of wages. We have no place where papers on subjects connected with gold and silver mining may be read and discussed. In fact, it does not seem as if any one mining company cared anything about the progress made by any other company in those details of management or work which is to settle the question of profit or loss.

We ought to have in this city a gold and silver institute, and we hope to see one organized before long. As it is now, personal experiences are never recorded except in the ephemeral columns of the local papers, inaccessible for reference.

Among many, our gold and silver mining interests are supposed to have only a temporary place. Some are surprised that the mines have lasted so long as they have. And this opinion is strengthened by the apparent listlessness of those engaged in this class of mining to perpetuate the experience they have gained.

It was only last year that the State itself showed any interest in the matter, when it established the Mining Bureau in our midst; an institution where a fine collection of minerals is being made, and valuable information is being compiled. But the mining engineers who are among us have never taken any steps to bring about any affiliation or good fellowship. They seem to be jealous of one another, and to keep each to himself that which experience teaches him.

At one time, several years ago, a number of mining engineers and "experts" met together, after the German fashion, at one of the beer cellars in this city. Others who were asked to join the meetings thought the place unsuitable. Then it was proposed to meet at the Academy of Sciences. A section was formed and a president elected, and that was all that was ever done. There seemed to be an uncongenial feeling generated when they all got together under these auspices.

There is no reason now why the assayers, mineralogists, mining engineers, metallurgists and others of kindred branches, should not join forces and found a gold and silver institute, where matters connected with gold and silver mining could be ventilated and discussed.

The death is announced of Mr. William White, the well-known chemist and mining authority. He was the author of numerous works, including the "History of Chemistry," "Economy of Health," "Chemistry of Vegetation," "Chemistry for Students," "Hints from a Chemist," "Mineral Resources of Newfoundland," etc., and was for over half a century a constant contributor to the *London Mining Journal* and scientific literature generally. He had held at different periods lectureships on metallurgy and chemistry at various leading educational establishments, and had earned for himself a high reputation as a lecturer and writer on agricultural chemistry. He died in London at the age of 71, from a painful disease contracted while conducting experiments in his laboratory.

A COMPLETE list of beacons, buoys, towers and other day-marks, in the Twelfth Light-house District, embracing the sea coast and bays of this State, corrected up to December 21st last, has been issued from the Government printing office, and copies will be furnished to ship masters free, at the Lighthouse Inspector's office, No. 120 Sutter street.

EASTERN wood workers are beginning to inquire after Nevada mountain mahogany. It is a heavy, fine-grained wood, which is susceptible of receiving a high polish, but all efforts to utilize it in the cabinet-maker's art have thus far proved fruitless, because nothing can be done to prevent its checking.

ARIZONA resembles most mining regions in being overcrowded with men who have no money and find it difficult to make a living. There are reported to be fully 2,000 persons in Tucson and Tombstone unemployed, who are living from hand to mouth, as best they can.

AMERICAN geologists are asked to compete for the prize of \$1,000 to be given at the approaching International Congress of Geologists at Bologna, for the best international scale of colors and conventional signs, for graphic representation of formations on geographical maps and sections.

LITTLE COTTONWOOD, Utah, it is expected will come to the front again this season, and resume its former position as a prosperous mining center.

## Mining Accidents.

John Hughes has brought suit against the San Francisco copper mining company to recover \$5,000 for alleged personal damages. It appears from the complaint that on the 10th of August, 1880, plaintiff was employed by defendants in the capacity of engineer of the mine of the company, and that, while in the discharge of his duties, the foundation of the hoisting works and the engines and machinery connected therewith all fell in, whereby plaintiff's right arm was considerably fractured, his right shoulder-blade was dislocated and his right collar-bone was greatly injured. He claims that the accident was the result of sheer negligence on the part of the defendants, and could easily have been averted by the exercise of a reasonable amount of vigilance. Since the above accident the plaintiff has been unable to work on account of the injuries he then sustained.

At Belmont, Montana, on the 16th ult., a fire occurred in the Belmont mine and six men burned to death. The blacksmith shop caught fire and communicated to a magazine of Hercules powder which exploded. The shaft caught fire and although two men escaped, the other five in the mine were burned.

At noon on the 24th ult., a miner named John Retallic, in the Zule mine, Amador county, was blown up and killed. It is customary to explode blasts just before the dinner hour, so that the smoke will be cleared away by the time the miners are through with lunch. On the morning named, deceased and a fellow worker named Frank Spinetti, prepared four charges, and lighted the fuses, Retallic lighted three, and Spinetti setting fire to the fourth. They then retired to a safe distance and awaited the explosion. Two minutes elapsed, and three explosions were heard. Deceased then asked Spinetti if he had lighted the fuse; to which the latter replied, "Yes; but I don't think it has gone off." All the holes were charged with giant powder, but the fuse of one charge was somewhat longer than the others. Deceased had charge of the blasting operations, and impatient probably at the delay, went forward to ascertain the cause. Safety requires that at least five minutes should be allowed to elapse before venturing near an unexploded cartridge. This length of time, however, was not allowed to transpire in this case. On reaching the fatal spot, Retallic remarked, "The three charges have done first-rate." These were his last words. A few seconds later, and the dilatory charge went off killing him and injuring his companion.

On the 22d ult., Theodore Fleitz, working in Lindermer & Hottinger's hydraulic claim at Quaker Hill, Nevada Co., saw a boulder weighing six or eight tons in the act of falling from the bank. He gave the alarm so that the other miners got out of the way, but before he could escape the mass fell, grazing him and breaking his shoulder and arm.

Henry F. Bullerman, a young man employed at the Sargent & Jacobs drift mine as brakesman, was the victim of a terrible accident, last week. The Nevada Transcript says that he reached through the slowly revolving iron wheel with his right hand to oil some of the machinery, when one of the spokes struck his arm—the right one—pressing it against the pump-bob with such force as to cut it almost entirely in two just above the elbow. He called for assistance, but no one heard him. He then raised the cage a few feet from the bottom of the shaft several times and let it drop again, hoping by this means to attract the attention of the men underground, but not until he had stopped the pumping machinery did they apprehend anything wrong, whereupon they went to the surface by means of the ladder and there found Bullerman in an exhausted condition. He was removed and it was found necessary to amputate the arm.

An accident occurred in the Baker mine, Placer county, last week, says the Placer Times, by which Cris. Helmkamp, one of the men employed in the mine, had his ankle badly broken and fractured. New blocking is being put in the flume in the tunnel and are being let down the shaft at the head of the tunnel by means of the derrick. On that particular occasion a lot of eight or nine blocks were chained together and were being let down when the chain slipped letting one of the heavy blocks fall down the shaft, 90 ft. deep. When it struck the bottom the block glanced off from another block and struck Mr. Helmkamp, about 20 ft. down the tunnel, crushing the bones of the ankle in a frightful manner.

GEORGE DALY.—The Leadville Democrat of February 18th says, in reference to the disturbance at the Robinson mining camp, that at three o'clock on the morning of the 17th an order came to Leadville from George Daly, by telegraph, for arms. Two cases of Winchester rifles and 2,500 rounds of ammunition were sent him. The morning of the 18th, at one o'clock, the Democrat received a special dispatch as follows: "All is quiet at Robinson and the authority of the Sheriff is acknowledged by both factions. George Daly has been warned to leave the camp, but Daly is not the man to obey such orders, and when there is any attempt to enforce such an order there will be a big disturbance."

THE new cable for the Chollar-Norcross-Sage shaft, on the Comstock, weighs 15,000 lbs.

## Legislative.

By the time this number of the PRESS is in the hands of its readers the Legislature will have adjourned, leaving a very large amount of business unfinished. The bill of the session, however, and which occasions the delay was finally considered. It is too bad it was not considered before, and other necessary measures attended to. However, the "debris" question is finally settled for a time at least.

Mr. Harlan tried to get Senate bill No. 319, to prevent the streams, rivers and bays of the State from filling up with debris from the hydraulic mines, referred to the Swamp Land Committee. This was refused.

The event of this week and of the session was the final consideration of Senate bill No. 27, to repeal the debris act. After the usual debate the roll was called, the issue being, "Shall the bill be read the first time?" with the following result:

Ayes—Alviso, Birney, Bost, Branch, Camron, Crank, Crumpton, Cunningham, Del Valle, Estey, Felton, Gay, Griffith, Hartson, Hendrick, Hinchshaw, Holden, Kilburn, Leach, Lsake, Matthews, of Tehama, Matthews, of San Benito, McMurray, Murphy, Patterson, of San Joaquin, Paulk, Platt, Reynolds, Samuels, Sargent, Siebe, Streeter, Wason, of Ventura, Werstbaugher, Whipple—35.

Noes—Arick, Brown, Burns, Chandler, Coleman, Daggett, Edwards, Fraser, Freer, Garrity, Gavigan, Geary, Gilmore, Hale, Hoyt, Howard, Jackson, Kesting, Kellogg, Lsne, Lewis, Long, May, McCallion, McClure, McDonald, Mein, Mudgett, Noonan, O'Connor, Paterson, of Nevada, Pinder, Reddick, Swift, Van Fleet, Warkins, Wason, of Mono, Wood, Young—39.

The bill was accordingly refused a first reading. The Committee on Federal Relations reported back A. C. R. 24, relative to asking the Federal Congress for an appropriation of \$20,000, to remove obstructions to navigation at the mouth of Smith river in Del Norte county, recommending its adoption; A. C. R. 23, for an appropriation of \$500,000, to secure our rivers and harbors against the damage by debris, recommending its adoption.

Watson, from the Prison Committee, reported favorably on Ssars' bill appropriating \$219,000 for the purchase of jute, jute machinery, lands, erection of buildings at San Quentin for the manufacture of jute.

Sears explained that the machinery and jute had been purchased and was now in San Francisco. The credit of the State had been pledged for its payment. This measure is necessary in order to provide employment for 1,500 convicts. He asked the suspension of the constitutional provision and the passage of the bill as an urgent necessity. Watson said the Constitution abolishes the contract system of prison labor. The contracts have expired and the prisoners are idle. The jute machinery alone cost \$100,000. It will cost \$25,000 for engines to run the looms. The Directors propose to buy of contractors the wood work machinery at a cost of \$10,000. The Directors purchased 50 acres of clay land, paying \$300 an acre. This was for a brickyard. The Directors have purchased \$40,000 worth of jute. The profits of the brick already made are more than the land cost. The Directors believe they can make the prison self-sustaining with this amount of money invested in jute, leather and wood-working machinery.

On a vote being taken the bill was finally passed.

Assembly bill No. 431, providing for a proper representation of California products at the World's Fair, to be held in New York in 1883, was finally passed.

Senate concurrent resolutions, relative to transferring the minerals at the State Library to the State Mining Bureau in San Francisco, were adopted.

SMELTING FURNACES.—The copper furnace now in course of construction for the Pinal company, in the Mineral Creek district, was built by Messrs. Rankin, Brayton & Co., of the Pacific Iron Works, San Francisco. This firm first introduced the water jacket in the construction of smelting furnaces, which have proved so successful in the reduction of copper and galena ores, and which are now in almost universal use in all parts of the country. No other invention has contributed so much to the development of this important interest. The cost of construction and running expenses are greatly reduced by this method of smelting. This firm have had a large experience in general mining machinery, as well as in this special line of work, having made, with few exceptions, all the smelting furnaces in use on this coast. Parties desiring to put up works of this character can, therefore, depend upon getting from these works the latest improvements applying to this process and machinery that will give the best possible results in any class of ore.—Globe Chronicle.

CHLORIDING is likely to again become a prominent feature of the mining industry in Silver Reef, and work has already commenced on several claims on the East reef. The charges for milling are somewhat lower than they have been heretofore, and should the rich streaks only come in big enough the boys will be able to make wages at it.



## A Glimpse of San Francisco Bay.

We give upon this page an engraving of such a glimpse of San Francisco bay as one might gain by standing on the crest of Telegraph hill and looking toward the city of Oakland. There is but a small portion of the bay included in the view, for San Francisco bay is a grand sheet of water, stretching from north to south about 60 miles, and having an area of 480 square miles. And yet our view includes some of the points of chief interest in connection with our commerce and passenger traffic. The outgoing and incoming ships which are seen are plying upon the channel which constitutes the harbor proper. Within the area embraced in this view the wheat fleet anchors, and across this water ply the steamers which go up and down the coast and across the Pacific ocean. The large island a little to the left of the center of the picture is Goat island, which won national fame by the congressional contention of which it was the bone, several years ago. Just to the right of Goat island and about a mile to the eastward are the wharves of the Central Pacific

## The Williams Process.

In our last issue we gave a description of a new process for desulphurizing ores by means of a peculiar method of applying the fuel. We were not then aware that the process was at work here. Since writing the article we have received from Mr. H. O. Lang, Sonoma, Tuolumne county, some impressions of the same invention, which he tells us has attracted great attention there. We append Mr. Lang's letter, which speaks for itself:

Latest among the unnumbered so-called processes for gold extraction which have attracted more or less attention, and have been successful in a greater or less degree in approaching the standard of excellence claimed, often injudiciously, by their inventors or proprietors, is found that process or invention whose name heads this article. It is proposed in the following to give a plain account of the furnace which is the subject of the Williams patent, and to endeavor to describe its mode of working suffi-

ciently to indicate whether it is likely to prove an important adjunct to the metallurgical processes of the day.

It is to be borne in mind that the sole function of the furnace is the roasting of sulphureted ores; and this roasting is claimed to be done more thoroughly and expeditiously than in any other furnace. It consists essentially of a modified blast furnace like those used for the manufacture of iron, but of smaller dimensions, and while preserving a similar inward contour, is provided with a hearth near the bottom; which hearth is horizontal, is made of cast-iron of a suitable thickness, and is perforated with a large number of small holes which form the only communication between the main upper part and an otherwise air-tight lower portion. By means of a blast pan or other suitable contrivance, whose description is not essential to this account, a supply of air is forced into this lower air-tight space, and rising, enters the charge which has been allowed to drop through a charging-door suitably placed. Of course, an amount of fuel is necessary; and herein consists a peculiarity of the invention. Heat-making ingredients are supplied in the shape of asphaltum and sawdust, which are mixed with the ore in the just proportions by means of a stirrer provided with radial arms which thoroughly incorporate the melted hydro-carbon with the other materials. The salient points, then, of the invention are these:

The perforated hearth to distribute the air currents, the employment of an artificial blast, and of sawdust and asphaltum as fuel. It would seem that these features are not separately new, but have been applied to furnaces which antedate this one by many years. The inquiry is not, how-

ever, into the priority of invention, but rather into the efficacy of the system.

To the practiced and scientific furnacemen of this day, it would come home forcibly that this furnace with its singular fuel must be the invention of some theorist, or the chance development of some clerk or mechanic without previous experience or knowledge of the art of roasting; and accordingly we are told that it was the accidental invention of an individual, whose occupation was laying down asphaltum sidewalks. But however fortuitously the invention came about, there are good reasons for considering the choice of combustibles an excellent one. As compared with charcoal, mineral coal or coke, we find asphaltum, and more particularly sawdust, to be a fuel of light specific gravity, creating comparatively little heat, and, above all, giving out when burned with an insufficient supply of air, a large amount of hydrogen, a gas to the remarkable desulphurizing powers of which, the process must be largely indebted for whatever of success it may achieve.

It may here be necessary to remind the unpracticed reader that in metallurgical operations of this sort, it is a great desideratum to keep

## Montana Mines.

In the early days of Montana, when her rich placers were being worked, and the miners were making fortunes, she attracted great attention. When most of these placers were exhausted the Territory began to drop back as a mining country. For a long time the quartz mines attracted comparatively little attention, but within the past two years, and this past year



VIEW OF SAN FRANCISCO BAY LOOKING TOWARD OAKLAND FROM TELEGRAPH HILL.

railway, where the hosts of travelers from the interior and the East take to the ferry boats to reach San Francisco. From these wharves also come to the city the thousands of people who find homes in Oakland and her sister cities on the east shore of the bay. At this point also is the solid pier, about two miles long, just finished, and upon which new ferry buildings will soon be erected, and this solid structure will soon bear the traffic which now goes over the old arrangement of piles and planks. Farther to the right lies the entrance to San Antonio creek, the avenue of travel lying between parallel sea walls a little more than two miles in length. This gives another means of access to Oakland and to Alameda, another beautiful city lying in the offing at the extreme right of the engraving. To the left of Goat island and nestling under the distant hills beyond the water, lies Berkeley with its State University and asylum for the deaf, dumb and blind. From the center of the engraving to the right the bay stretches southward about 30 miles between the counties of Alameda and San Mateo; and to the left, the bay extends northward nearly the same distance, its waters laving the shores of Marin, Sonoma, Napa, Solano and Contra Costa counties.

The Wood river excitement continues all over Nevada, Utah, Montana and throughout the East. It is thought that at least 10,000 people will go there as soon as spring opens.

TUESDAY evening at 6 o'clock a blast of 24,000 lbs. of Judson powder, was set off in the American mining company's claim at Sebastopol, one mile west of North San Juan.

ciently to indicate whether it is likely to prove an important adjunct to the metallurgical processes of the day.

It is to be borne in mind that the sole function of the furnace is the roasting of sulphureted ores; and this roasting is claimed to be done more thoroughly and expeditiously than in any other furnace. It consists essentially of a modified blast furnace like those used for the manufacture of iron, but of smaller dimensions, and while preserving a similar inward contour, is provided with a hearth near the bottom; which hearth is horizontal, is made of cast-iron of a suitable thickness, and is perforated with a large number of small holes which form the only communication between the main upper part and an otherwise air-tight lower portion. By means of a blast pan or other suitable contrivance, whose description is not essential to this account, a supply of air is forced into this lower air-tight space, and rising, enters the charge which has been allowed to drop through a charging-door suitably placed. Of course, an amount of fuel is necessary; and herein consists a peculiarity of the invention. Heat-making ingredients are supplied in the shape of asphaltum and sawdust, which are mixed with the ore in the just proportions by means of a stirrer provided with radial arms which thoroughly incorporate the melted hydro-carbon with the other materials. The salient points, then, of the invention are these:

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the temperature so low as not to be in danger of fusing the sulphides before they are reduced, in the copper, should it occur. Melting would in either case be disastrous to the results of the roasting for obvious reasons. Too copious a supply of air, from its tendency to elevate the temperature of the ore, and on the other hand, consuming the fuel without producing the requisites reducing effect must be deprecated. This is a point probably not fully understood as yet by the men who have had charge of the operations. The furnace is seriously open to criticism in the important point of duration of the desulphurizing process. It is apparent that combustibles of the nature of those employed would speedily be consumed, and with their extinction, the desulphurization must also end, for whether the sulphur be consumed with air, passing off as sulphurous acid, or partially converted into sulphuric acid, or whether it combine with hydrogen, producing the well-known sulphureted hydrogen, it requires time and an elevated temperature to thoroughly effect the chemical decompositions. The unmanageableness of the combustion, which should extend into all parts of the mass, and not be confined to its outer surface, may be counted as another objection; and finally the necessity of considerable scientific knowledge and professional skill on the part of the operators may act as an obstacle to the successful employment of this mode of roasting.

It would be wrong at this point, however, to predict a failure to the process, because, so far, none of the essentials to success have been complied with. Because the works in Tuolumne county have been obliged to discontinue operations, it does not follow that under a more ca-

particularly, the Territory is again coming to the front as a bullion producer. The mining people there are sanguine of their future, as will be seen by the following paragraph from the *Butte Miner*:

Our Montana mines are, each year, developing into valuable properties. This Territory is looming forward prominently as the mining center of the United States, and the Butte mines are steadily gaining a national reputation for wealth and permanence. The large amount of capital expended in opening and developing the mines in the Summit Valley district is money spent that will return compounded. There is now more encouragement for mine owners than ever before to open and develop their mines, either for the purpose of effecting sales, or for the object of profitably operating and working their properties. The facilities for working the mines are better than formerly, and the use of modern machinery economizes the operations of all kinds of mining enterprises very materially. Soon we will be in direct railroad connection with all parts of the country, and that will not only cheapen the cost of supplies, but it will bring to our camps and mining districts hundreds of men representing and offering for investment millions of dollars now awaiting opportunities for investing. Thousands of men, without capital, perhaps, but with willing muscle, will come to our camps, where the lucky poor man stands on an equal footing and takes equal chances with the most fortunate operator. Our mines are now only in their incipient stages of development, when compared with what they are bound to be just as soon as their value is made known throughout the country.



## The State Bag Factory at San Quentin.

The mooted manufacture of jute bags by the State, employing the convict labor at San Quentin prison, has naturally excited no little interest among bag consumers. The interest seems to be twofold—first, through the hope of getting cheaper bags; second, the chance of sale for such jute as our farmers might grow, and thus the State might eventually become self-supporting in the matter of bags instead of exporting millions of dollars for these materials. The machinery for setting up at the prison is now on the way to this port, and a bill is now before the Legislature to appropriate money to pay for it. Other facts about the enterprise are given in the 1880 report of the Prison Directors to the Governor, as follows:

Acting upon the suggestion contained in your Excellency's inaugural address, respecting the manufacture of jute bags, the Board, after making an exhaustive examination of the whole subject, determined to establish the enterprise, and for the following reasons, viz.: the enormous demand for these goods by the farmers of this State; the larger portion of their value being in the labor necessary for their production, it will afford constant and remunerative employment to nearly or quite 500 convicts, many of whom might be physically incapacitated for the hard labor required in other branches of industry, and especially because of its non-competition with free white labor, and of the unqualified endorsement it has received from leading farmers and other business men of the State.

Of the many manufacturing interests, which we have investigated, this seems the most feasible, the most likely to be successful and the best adapted to the wants of our State.

Accordingly, on the 21st day of August last, we entered into a contract with Messrs. Fairbairn, Kennedy & Naylor, of Leeds, England, through their authorized agent, John E. Stevens, for the purchase of 100 looms, and the other necessary machinery required in the manufacture of hurlaps, twine and jute bags, to be shipped from Liverpool on or before the first day of December, 1880. The cost of the machinery laid down in San Francisco, including tariff, freight and insurance, will be \$96,000, or to cover all contingencies say \$100,000. The Board expect the factory to be in operation about the 1st of May next; such at least is their earnest desire. That there may be no delay in beginning operations on the completion of the factory, an order was given in October last to Messrs. Degener & Co., of San Francisco, for 250 tons of jute, to be shipped immediately from Calcutta. Another order was also given to Messrs. Balfour, Guthrie & Co., for 250 tons, to be shipped at a later date.

In this connection we may remark that to induce the raising of jute we have ordered a quantity of jute seed for distribution among the farmers who wish to experiment in its cultivation.

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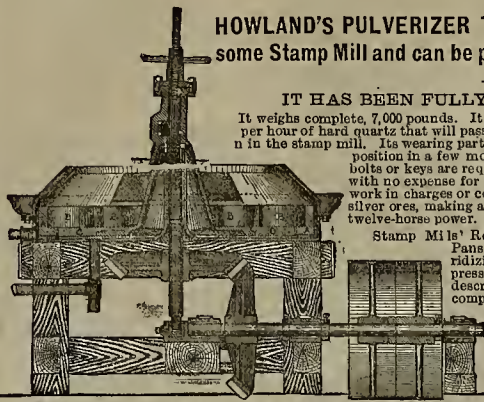
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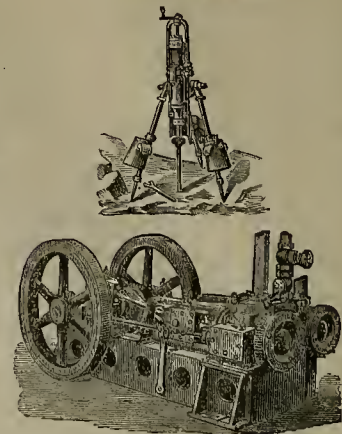
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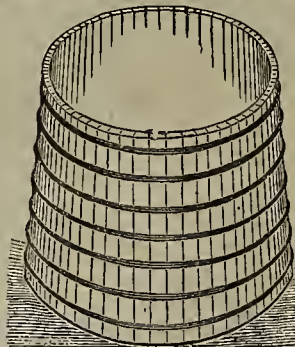
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KUSTEL'S CONCENTRATION OF ORES (of all kinds), including the Chlorination Process for gold-bearing sulphurets, arsenurds, and gold and silver ores generally, with 120 lithographic diagrams. 1877. This work is unequalled by any other published embracing the subjects treated. Post-paid, \$7.50. Printed and sold by Dewey & Co., S. F.

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The Dodge Rock Breaker CHALLENGES THE WORLD to produce as good and cheap a machine. Rock Breaker and Cornish Rolle Combined in one Machine. Pulverizers to granulate Ores for Roasting, chloriding, leaching & concentrating.

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Room with steam power to let in the Pacific Power Co.'s new brick building, Stevenson street, near Market. Elevator in building. Apply at the Company's office, 314 California street.

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Patent Mill and Street Lamps to Burn Coal Oil, Naptha and Gas.

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Hydraulic Mining and Locomotive Head Lights, with the Latest Improvements, making them the best and cheapest in the market.

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I am prepared to demonstrate, if miners will bring me from 500 pounds to a ton of their ores, that I can save from 25 to 100 per cent. more than any other machinery now in use. I will make no charge.  
Machinery can be seen in operation every day at No. 143 Fremont Street.

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Assaying and Amalgamating, Ores Tested.  
Jewelers' Sweeps Worked.



## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING FEBRUARY 16TH, 1881.  
9,564.—MATTREES FRAME—Reissue—R. E. Campbell, S. F.  
237,813.—GRIP—H. Cosebolt, S. F.  
237,814.—CABLE RAILWAY—H. Cosebolt, S. F.  
237,851.—WINDMILL—E. Fasket, San Jose, Cal.  
237,908.—NEEDLE—H. Royer, S. F.  
237,921.—GRINDING PAN.—Steiger & Kerr, S. F.  
237,927.—HEADER WAGON—Tayntou & Derrickeon, Olavton, Cal.  
237,934.—DRAW BAR—A. H. Weir, Los Angeles, Cal.  
237,942.—GUN—A. H. Woolsey, Gilroy, Cal.  
237,859.—POTATO DIGGER—F. McLeilen, White River, W. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Railroad Notes.

The Oregon Railway & Navigation Company are vigorously pushing work along their line beyond Dalles. A very large force of men are engaged, and great activity is everywhere displayed.

An immense transfer boat is being built at Celilo, to transfer the cars of the N. P. R. R. across Snake river at Ainsworth. The boat will be 200 ft. long, 36 ft. beam and 7 ft. hold. It will be ready for service by the first of May. Two very large boats are also in course of construction at Dalles. Vice-President Oakes has made a requisition for 30 more locomotives from the East, which, including two now on the way, makes 32 to be expected. With a reasonable amount of good luck, trains will be running clear through to Walla Walla in less than 40 days from date.

The section of the Sacramento and Placerville railroad, running from Folsom to Shingle Springs (26½ miles), has been placed in the hands of a receiver, and all the rolling stock has been withdrawn. The road was once before sold by a receiver and bought by the Central Pacific railroad, but old claims have appeared. The road has never paid, it is said, and there are doubts if it will be opened again for a long time.

The Bodie Railway company has been organized to build a narrow gauge railway from Bodie to the timber tracts lying southwest of Mono lake. The road will be exclusively for freight and will not be more than 40 miles long. The tract of land is situated in township 1, south of ranges 27 and 28, east of Mount Diablo base and meridian. The Directors are H. N. Yerrington, A. J. Ralston, R. N. Graves, W. S. Wood, William Willis, J. B. Low and J. M. Quay, and Seth and Dan Cook are among the stockholders. R. N. Graves is President; A. J. Ralston, Vice-President, and William Willis Secretary and Treasurer. The road will greatly facilitate the development of a great gold-bearing section in the main range of the Sierra Nevada and will confer special advantages upon the Homer mining district. Eventually the road will be of great service to tourists and others, who desire to view the picturesque scenery west of Mono lake.

The Chicago Times says that the losses entailed upon the principal Western roads by the snow blockades will more than equal the net earnings of those lines for January and February. Nearly 1,000 miles of road operated by the Chicago, Milwaukee and St. Paul company, in Minnesota and Dakota, have practically been blockaded all winter.

The tracklayers of the Carson & Colorado railroad, says the Dayton Times, resumed work at the front last Sunday morning. Since then ten miles of track have been laid. This is at the rate of about a mile and a half per day. It is the intention of Mr. Lawes, the superintendent of construction, to not only keep up this rate of progress, but to increase it to two miles per day as soon as the Walker Lake Reservation house is reached.

The locomotives of this road are of exceptional strength. They haul as big average loads as broad-gauge locomotives, the usual load being 20 cars loaded with ties, rails, fish-plates, spikes, etc. This, the train hands say, is fully as much as could be hauled on any broad-gauge having as steep grades as those on the Carson & Colorado. The loads now aggregate about 125 tons, besides the weight of the cars; but when the cars have run a while, the train hands say, the locomotives can haul loads of 150 tons with comparative ease.

All the breaks made in the track during the recent storms have been repaired in the most substantial manner.

The railroad will be completed to Hawthorne sometime in April.

The road is now in running order for 55 miles from the Mound House.

One train runs each way daily, from the Mound House to the end of the track. Although the road is not open for traffic this, train hauls to the Stinking Wells, Wahuska and Walker river whatever freight is urgently required at those places, or at the copper mines west of Mason valley.

### News in Brief.

MONTANA cattle shipments doubled last year. Three whales were caught at San Simeons, last week.

COWBOYS are carrying off cattle from the New Mexican herds.

FOUR men were drowned in the Columbia river by the collision of the steamer Oregon, with a river steamer and barge.

LEE WARDEN killed himself near Oleta, Amador county, by jumping into a mining shaft.

WHITELAW REID, editor of the N. Y. Tribune, is to be married to a daughter of D. O. Mills.

A WASHINGTON dispatch says: The United States currency outstanding at this date is \$362,585,258.

PEOPLE desiring to go to Wood river will get there in good season by starting on or about the 1st of April.

THE losses by fire and robbery during the riot in Lima and Callao are estimated at \$6,000,000.

D. O. MILLS, formerly of this State, bought property valued at \$1,500,000 in New York last month.

THE coinage for February at the United States mint at Philadelphia was 4,278,660 pieces, valued at \$6,320,900.

THE French Government asks for a man-of-war to watch the Tahiti islands and additional ships for Chinese waters.

THE North Star hoisting works, at Austin, Nev., belonging to the Manhattan Mining Co., was destroyed by fire Feb. 23d.

ELIZABETH W. BONJETTI committed suicide Feb. 21st, near Saratoga, Santa Clara county, by cutting her throat with a razor.

GENERAL amnesty for all persons implicated in or condemned for political offenses will be proposed by the Spanish Ministry.

THE Boers, instead of being subdued, have had a fight with the British forces and killed Gen. Colley, 22 officers and 627 men.

CARLYLE has bequeathed his Dumfriesshire estates to the University of Edinburgh for founding Bursaries in the Faculty of Arts.

THE Catholic Orphan asylum at Scranton, Penn., was burned on the night of Feb. 20th, and 17 children perished in the flames.

EDISON has moved from Menlo Park to No. 65 Fifth avenue, New York, where the officers of the Electric Light Company will be established.

THE N. P. R. R. company have withdrawn their lands from the market in the Walla Walla valley, W. T., intending to reorganize their land department.

THE Minnesota Capitol caught fire while the Legislature was in session and burned to the ground. Loss \$100,000, in addition to the valuable libraries.

ACCORDING to a decision just rendered by the United States Circuit Court at Chicago, a Chinaman cannot become a naturalized citizen of the United States.

GEORGE STEPHENS, President of the Canada Pacific Railway Syndicate, has sailed for London to obtain \$10,000,000 on bonds, with which to prosecute this work.

BANK COMMISSIONERS Coleman and Watt examined the Nevada Bank of San Francisco on the 26th ult. and found it solvent, with assets and liabilities amounting to \$12,937,061.79.

MOST of the stock brought to Antioch from the flooded islands will remain during the spring and summer months, but that coming from Yolo county has been mostly returned.

THE total expenditures since the S. F. Library was opened have been \$66,263 \$6, and receipts \$95,597.93, leaving an available balance of \$29,334.07. There are 22,746 books in the library.

HEARNE, land agent to the brother of the late Lord Mountmorris, has been fired at by two men near his residence at Ballinrohe, Ireland, and mortally wounded. He received six pistol shots.

THE counties of Alameda, Santa Clara, San Joaquin, Merced, San Diego, Contra Costa and other counties interested in the R. R. tax suits, will join issues and make a single test case, thus lessening the expense to all.

WILLOW RANCH, eight miles south of the State line in Modoc county, had a heavy set-back in November, by the burning of the Snider Mill, with about 6,000 bushels of wheat; total loss, \$16,000 to \$18,000; insurance, \$10,000.

THE recruiting rendezvous of the United States regular army at San Francisco has been closed for the present. Discharged soldiers, with excellent characters, will be re-enlisted and sent to the companies they desire to join. None others need apply. It is further learned that recruiting for the regular army in the Eastern States is sufficient to fill all expiring vacancies from these sources.

THE Salt Lake Tribune says: Salt Lake is on the eve of a great boom. Several new railroads are soon to center here, the Street Railway Company are extending their line, the Electric Light, Power and Heating Company's works are nearing completion, the Telephone Company is stretching its wires and opening its exchange, large business blocks are contemplated, and dwelling houses innumerable.

AT noon, Feb. 22d, 18 deep-water vessels of from 1,200 to 1,500 tons register entered this port, in addition to coasting vessels and steamers, presenting a scene which has not been witnessed before since 1860, according to the records of the Merchants' Exchange. The majority of the vessels hailed from Eastern and foreign ports, and are under charter to load wheat stored along the city front. Those that were not already chartered for that purpose, it is understood will be in a short time.

## For \$1.

We want 5,000 new subscribers during 1881, and shall make all reasonable efforts to secure them.

To induce new readers to try our paper, we offer to send the PACIFIC RURAL PRESS three months (thirteen weeks), with either of the following premiums, for ONE DOLLAR:

1. One dollar's worth of flower and garden seeds, postage paid, according to schedule and prices elsewhere noted.

2. One of Dewey's Newspaper Binders (elastic with cloth-covered sides, size of RURAL PRESS) for holding papers in book-form.

3. "Pacific Rural Hand-Book" on California Horticulture, Floriculture, and Gardening, in cloth binding with gilt title.

4. The "American Beekeepers' Guide," a complete manual and reference book on all subjects connected with bee culture, in cloth binding.

5. A pair of fine French Chromos, each 11x15 inches; one "A Gleeful Boy at Dinner," the other "Caught Napping."

6. Two Photo-Engraved copies of fine steel-plate engravings ("Hunting" and "Fishing"), each 18x24 inches.

7. "Ropp's Easy Calculator," containing many convenient tables for showing the value of grain, timber, coal, and all other kinds of merchandise; bound in cloth.

8. Thirteen assorted card Nos. of the RURAL PRESS.

N. B.—For \$3.50 (THREE DOLLARS AND HALF) we will send the RURAL PRESS one year, and two of either of the above numbered premiums. Old subscribers who are paid up to date, or beyond, can make further remittances on the same terms as above offered to new subscribers.

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No. 202 Sansome Street, San Francisco, Cal.

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Extra Inducements for New Subscriptions.

There should be more gardens planted on this Coast. It would add pleasure and health to many, and enhance the value and attraction of their homesteads. To encourage the planting of seeds, and to extend the circulation of the PACIFIC RURAL PRESS, we will offer, while this notice remains in our columns, to furnish to all old or new subscribers, the following seeds on the favorable terms named below:

VEGETABLE SEEDS.

IN PAPERS POST PAID. CTS.

1. Early Blue Turnip..... 10  
2. Early Long Dark..... 10  
3. Early French Ox-heart..... 5  
4. Early French Ox-heart..... 5  
5. Large Late Drum-head do..... 10  
6. Red Dutch (or pickling) do..... 10  
7. White Solid Celery..... 10  
8. Early Paris Cauliflower..... 10  
9. Early Horn Marrow..... 10  
10. White Belgian do..... 10  
11. Early Frame Cucumber..... 10  
12. King of the North..... 10  
13. Early Gherkin..... 10  
14. Pickles..... 10  
15. Victoria Cabbage Lettuce..... 10  
16. Simpson's Early Curled do..... 10  
17. Large Yellow Centaurope..... 10  
18. Extra Fine Nutting do..... 10  
19. Casaba Melon (new)..... 15  
20. Mountain Sweet Watermelon..... 10  
21. Black Spanish..... 10  
22. White Imperial, or Lodi Melon..... 15  
23. Early Red Onion..... 10  
24. White Portagal or Silver Skin..... 10  
25. Yellow Danvers do..... 10  
26. White Dutch Parsnip..... 10  
27. New Early Round do..... 10  
28. Early Scarlet Turnip..... 10  
29. Radish..... 10  
30. Black Spanish or Winter do..... 10  
31. Early Scollop Bush Squash..... 10  
32. Early Summer Cucumber..... 10  
33. Neck do..... 10  
34. Boston Marrow Winter do..... 10  
35. New Early Wonder do..... 10  
36. Cerise de Zondra do..... 10  
37. Early Red Smooth Tomato..... 10  
38. Toppat do..... 10  
39. Canada Victor (earliest) do..... 10  
40. Early White Flat Dutch Turnip..... 10  
41. Long White Turnip..... 10  
42. Improved Late Rutabaga..... 10  
43. Kohlrabi..... 10  
44. Scotch Kale..... 10  
45. Curled Parsley..... 10  
46. Spinach..... 10  
47. Sage..... 10  
48. Thyme..... 10  
49. Blue Gum..... 25  
50. Yorkshire Hero..... 25  
51. Black German Wax Beans..... 10  
52. Refugee..... 10  
53. Red Valentine do..... 10  
54. Extra Early Peas..... 10  
55. Champion of England..... 10  
56. Yorkshire Hero..... 25  
57. Queen of Dwarf..... 10

58. Amaranthus Caudatus (Love-lies-bleeding)..... 5  
59. Antirrhinum Mefus..... 5  
60. Eucalia Coccinea (Tas. sel flower)..... 5  
61. Campanula Speculum..... 5  
62. Venus Looking Glass..... 5  
63. Convolvulus, white fragrant..... 5  
64. Centaurea Cynus (Bachelor's Button)..... 5  
65. Clarkia, fine mixed..... 5  
66. Convolvulus (Morning Glory), mixed..... 5  
67. Foxglove, mixed..... 5  
68. Gilla, mixed..... 5  
69. Globe Amaranthus..... 5  
70. Gypsophila Elegans..... 5  
71. Hibiscus Africanus..... 5  
72. Ice Plant..... 5  
73. Larkspur, finest mixed..... 5  
74. Linum Grandiflorum (Flax)..... 5  
75. Love-in-a-mist..... 5  
76. Marigold, dbl French..... 5  
77. Mignonette, Sweet..... 5  
78. Nasturtium..... 5  
79. Nola..... 5  
80. Portulaca, mixed..... 5  
81. Poppy, double mixed..... 5  
82. Rocket, Sweet..... 5  
83. Scabiosa, dbl, mixed..... 5  
84. Sensitive Plant..... 5  
85. Sweet Peas, mixed..... 5  
86. Sweet William, mixed..... 5  
87. Sunflower, Cal. double..... 5  
88. A. d. m. Chirrosa (Mountain Fringe)..... 10  
89. Althea (Hollyhock) fine mixed..... 10  
90. Aster, mixed China..... 10  
91. Australian Vine..... 10  
92. Balsam (L. Slipper) fine mixed..... 10  
93. Ballou's Vine..... 10  
94. Brodiaea..... 10  
95. Canna (Indian Shot)..... 10  
96. Celosia Cristata, fine mixed (Oxcomb)..... 10  
97. Chrysanthemum Album..... 10  
98. Dahura, fine mixed..... 10  
99. Evening Primrose..... 10  
100. Four O'clock, mixed..... 10  
101. Forget-me-not..... 10  
102. Geranium Zondra..... 10  
103. Godetia (The Bride)..... 10  
104. Gourd (Hercules Club)..... 10  
105. Impatiens (Cypress Vine)..... 10  
106. Indian Pink, double mixed..... 10  
107. Lobelia—Blue..... 10  
108. Musk Plant..... 10  
109. Nierembergia Gracilis..... 10  
110. Pansy, fine mixed..... 10  
111. Petunia..... 10  
112. Phlox Drummondii fine mixed..... 10  
113. Pyrethrum Aureum (Golden Feather)..... 10  
114. Salpiglossis, mixed..... 10  
115. Stock (Ten Week)..... 10  
116. Wallflower, fine mixed..... 10  
117. Zinnia, mixed..... 10  
118. Bellis Perennis (Daisy) single..... 15  
119. Campanula Medium ( Canterbury Belle)..... 15  
120. Canary Bird Flower..... 15  
121. Thunbergia, mixed..... 15  
122. Aquilegia Alpina (Columbine)..... 20  
123. Heliotropium, dark..... 20  
124. Verbena, choice mixed..... 20  
125. Violet, Blue..... 20  
126. Balm Camella, flow..... 20  
127. Ostrich..... 20  
128. Ostrich, fine mixed..... 20

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## Our Agents.

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BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

INVENTORS, and others interested, will receive Dewey & Co.'s MINING AND SCIENTIFIC PRESS PATENT ANNUAL Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

THE State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

### Metals.

(WHOLESALE.)

WEDNESDAY M., Mar. 2, 1881.

IRON.—		
American Pig, soft, ton.....	—	@ 30 00
Scotch Pig, ton.....	25	@ 25 00
American White Pig, ton.....	—	@ 27 00
Oregon Pig, ton.....	—	@ 27 00
Refined Bar.....	4 1/2	@ 8
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ 9
Norway, according to thickness.....	8 1/2	@ 9 1/2
STEEL.—		
English Cast, D.....	14	@ 15
Black Diamond, ordinary sizes.....	12	@ 15
Drill.....	8	@ 9
Flat Bar.....	—	@ 14
Flat Steel.....	—	@ 6 1/2
COPPER.—		
Ingot.....	—	@ 52
Sheet.....	—	@ 20
Sheathing, Tinned 14x8.....	—	@ 42
Nails.....	—	@ 42
Boils.....	38	@ 42
Old Composition.....	—	@ 18
Bar.....	—	@ 22
Precipitate, 100 fine.....	18	@ 19
LEAD.—		
Pig.....	4 1/2	@ 5
Bar.....	—	@ 6
Pipe.....	—	@ 8
Pipe, Sheet.....	—	@ 9
Shot, Discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Round.....	—	@ 2 30
Chilled ".....	—	@ 2 50
TIN PLATES.—		
10x14 C Charcoal.....	—	@ 7 00
10x14 I C Coke.....	—	@ 9 00
Best Tin.....	—	@ 25 00
Australian.....	23	@ 24 00
I. C. Charcoal, Roofing 14x20.....	—	@ 3 00
20x28.....	19	@ 31 00
ZINC.—		
By the Cask.....	—	@ 9
Zinc Sheet 7x3 ft. to 10, lb, less than cask.....	—	@ 10
NAILS.—		
Assorted sizes.....	\$ 62 1/2	@ \$ 75



## Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending March 1, 1881.

Feb. 23	Feb. 24	Feb. 25	Feb. 26	Feb. 27	Feb. 28	Mar. 1
30.195	30.140	30.210	30.221	30.242	30.161	30.252
30.097	30.069	30.140	30.090	30.157	30.094	30.121
MAXIMUM AND MINIMUM THERMOMETER.						
69	63	61	60	62	62	62
64	50	52	54	54	51	52
MEAN DAILY HUMIDITY.						
63.7	80.3	77.3	94	91	89.3	64.3
PREVAILING WIND.						
N	W	W	W	SW	W	NW
WIND—MILES TRAVELED.						
167	256	101	250	60	122	189
STATE OF WEATHER.						
Clear.	Fair.	Cloudy	Cloudy	Fair.	Cloudy	Clear.
RAINFALL IN TWENTY-FOUR HOURS.						
	.12	.83	.01			.02
Total rain during the season, from July 1, 1880, 28.07 in.						

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

## DIVIDEND NOTICE.

OFFICE OF THE

## Eureka Consolidated Mining Company,

Nevada Block, room No. 37, San Francisco, February 15th, 1881.—At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 64) of Fifty (50) Cents per share was declared, payable on Monday, February Twenty-first (21), 1881, for the purpose of electing a Board of Directors to serve for the ensuing year, and for the transaction of such other business as may be presented. Transfer books will close on Friday, February Twenty-fifth (25), 1881, at the hour of 12 M. J. W. PEW, Sec'y.

## ANNUAL MEETING.

The regular Annual Meeting of the Stockholders of the Peytona Gold and Silver Mining Company will be held at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California, on Monday, the Twenty-eighth (28) day of February, 1881, at the hour of 12 M., for the purpose of electing a Board of Directors to serve for the ensuing year, and for the transaction of such other business as may be presented. Transfer books will close on Friday, February Twenty-fifth (25), 1881, at the hour of 12 M. J. W. PEW, Sec'y.

Office—310 Pine Street, Room 15, San Francisco, Cal.

## Booth Gold Mining Company.—Location of principal place of business, San Francisco. Location of works, Auburn, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Second (2) day of February, 1881, an assessment, No. Three (3), of Three (3) Cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room No. 44, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Seventh day of March, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the Twenty-eighth (28) day of March, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Directors.

GEO. R. SPINNEY, Sec'y.

Office—Room No. 44, No. 310 Pine Street, San Francisco, Cal.

## Blue Bird Mill and Mining Company.—

Location of principal place of business, San Francisco. Location of works, Globe District, Pinal County, Arizona.

Notice.—There are delinquent, upon the following described stock, on account of assessment, No. one (1), levied on the eighth (8) day of January, 1881, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
West Evans.....	2	6	\$60 30
James Daly.....	1	6	00 30
W H Knight, trustee.....	5	100	5 00
W H Knight, trustee.....	6	100	5 00
W H Knight, trustee.....	7	100	5 00
W H Knight, trustee.....	8	100	5 00
W H Knight, trustee.....	9	100	5 00
W H Knight, trustee.....	10	50	2 50
W H Knight, trustee.....	11	50	2 50
W H Knight, trustee.....	12	50	2 50
W H Knight, trustee.....	13	50	2 50
W H Knight, trustee.....	14	50	2 50
W H Knight, trustee.....	15	50	2 50
W H Knight, trustee.....	16	50	2 50
W H Knight, trustee.....	17	50	2 50
W H Knight, trustee.....	18	50	5 00
Edward Bennison.....	3	6	00 30
Edward Bennison.....	44	100	5 00
John T Soule.....	39	150	7 50
J T Soule.....	25	300	15 00
J T Soule.....	26	200	10 00
J T Soule.....	73	25	1 25
J T Soule.....	74	25	1 25
J T Soule.....	75	25	1 25
J T Soule.....	76	25	1 25
J T Soule.....	77	50	2 50
J T Soule.....	84	200	10 00
J T Soule.....	86	18,500	925 00
J T Soule.....	101	50	2 50
J T Soule.....	83	90	4 50
Warren Holt.....	32	20	1 00
Edmund Braydon.....	34	500	25 00
Edmund Braydon.....	35	500	25 00
Edmund Braydon.....	48	1000	50 00
T M Wattle.....	38	200	10 00
Geo Bennison, trustee.....	40	100	5 00
Geo Bennison, trustee.....	41	100	5 00
Geo Bennison, trustee.....	42	100	5 00
Geo Bennison, trustee.....	43	100	5 00
Geo Bennison, trustee.....	45	500	25 00
F P Thompson.....	58	1000	50 00
F P Thompson.....	59	3123	156 15
F P Thompson.....	98	2500	125 00
M Griffith.....	55	750	37 50
Isaac W Smith.....	69	1000	50 00
W C Manson.....	62	200	10 00
David Drum.....	88	6245	312 25
Donald MacKonsie.....	94	200	10 00
C B Rawson.....	92	50	2 50
C B Rawson.....	93	100	5 00
Natty Grady.....	05	50	2 50
E B Perrin.....	90	1551	77 55
Mrs Mary Chamberlin, trustee.....	102	10,000	500 00

And in accordance with law, and an order of the Board of Directors, made on the eighth (8) day of January, 1881, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, No. 10 Market Street, on Monday, the fourteenth (14) day of March, 1881, at the hour of 2 o'clock, P. M., of each day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

W. H. KNIGHT, Sec'y.

Office—No. 10 Market Street.

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CHAR. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer.

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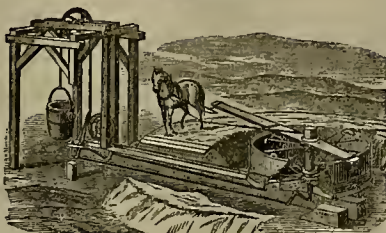
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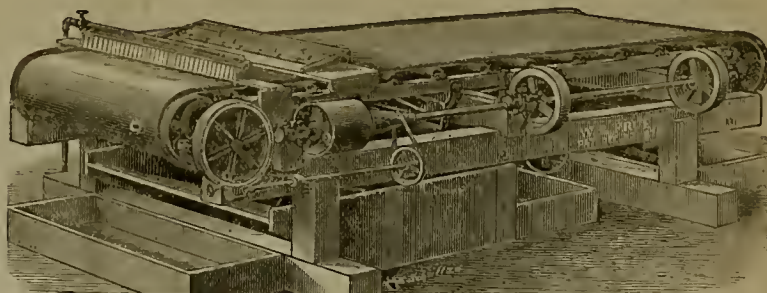
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## NOTICE.

TO ALL WHOM IT MAY CONCERN:  
Notice is hereby given that George Denton Cardew is no longer a Director of the Isabelle Gold and Silver Mining Company, of London, England, Limited, and that any Power of Attorney which he may have had from said Company was invalid, for the reasons set forth in the following Resolutions:  
1. Resolved, that as the Power of Attorney given to Mr. Geo. Denton Cardew on the 24th of August last, was not duly authorized, and the seal of the Company was affixed thereto without the authority of a duly constituted Board of Directors, the Directors of the Company hereby repudiate all acts and things done, or caused to be done by Mr. G. D. Cardew, under or by virtue of such Power of Attorney, and that by way of caution the Directors of the Company do rescind the said Power of Attorney, but without in any way recognizing the validity of such Power of Attorney, and such Power of Attorney is hereby rescinded accordingly; and that the solicitor of the Company inform Mr. G. D. Cardew of this Resolution, and request him to return to the office of the Company, the said Power of Attorney.  
2. Resolved, that the Solicitor do forward a copy of the last Resolution to Mr. Lewis Chalmers, the Manager at the Mines, and request him to advertise in such papers in California as he may think necessary, the said Resolution, or the purport thereof; and also the fact of Mr. G. D. Cardew having resigned the office of Director of the Company.  
By order of the Directors,  
LEWIS CHALMERS, Manager.

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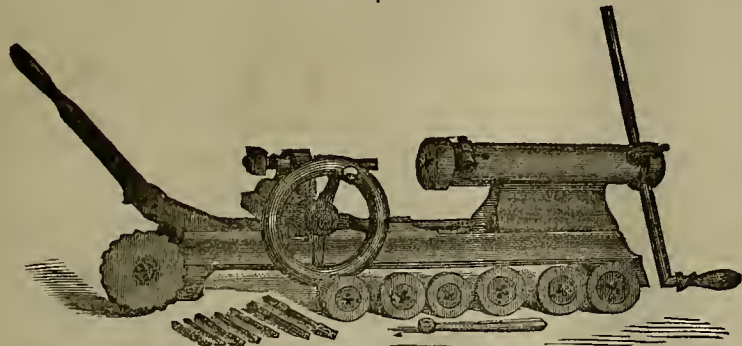
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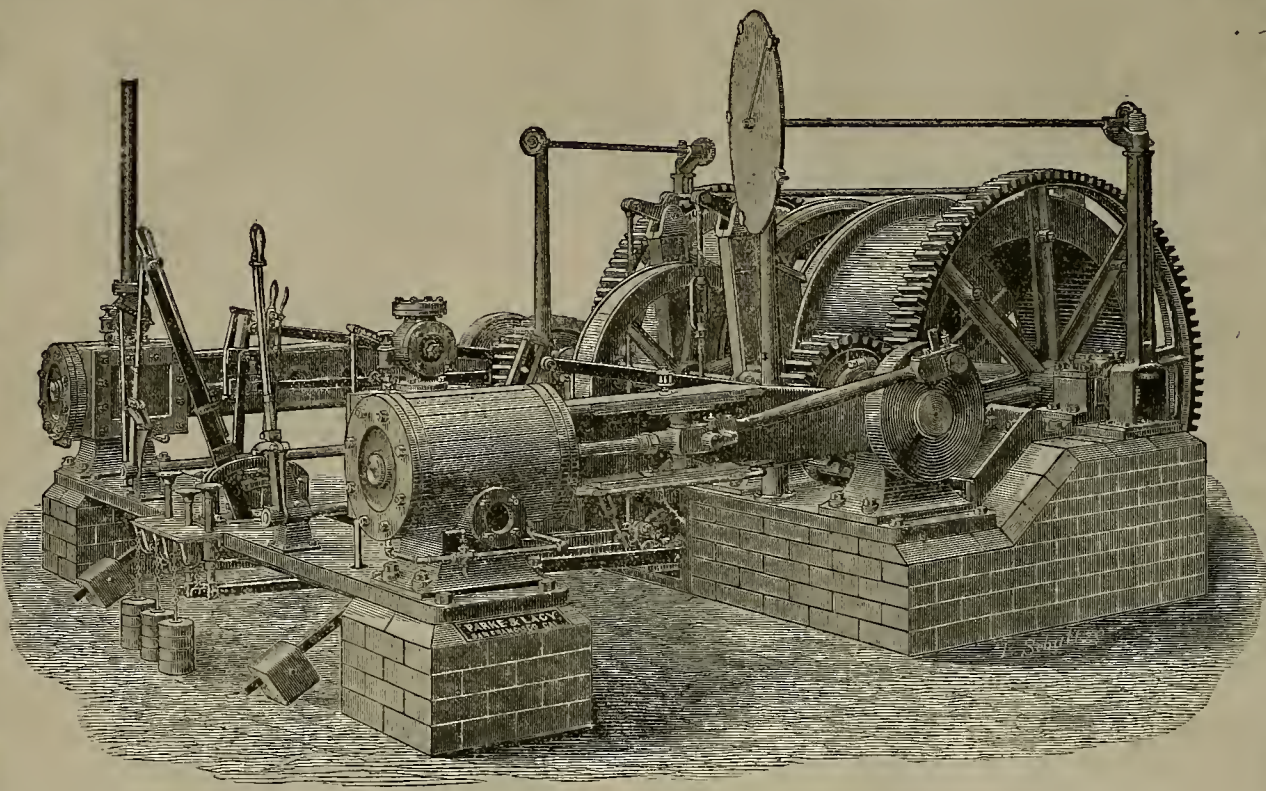


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SAN FRANCISCO, SATURDAY, MARCH 12, 1881.

VOLUME XLII  
Number 11.

## An Improved Electro-Medical Apparatus.

Dr. James B. Williams, of 759 Market St., in this city, has lately erected an improved electrical apparatus for medical purposes, an illustration of which is given in the present issue. The apparatus was designed and manufactured by himself for his own use, and is the most complete apparatus of the kind on the coast, besides being one of the most complete in existence.

The apparatus is mounted on a table measur-

can be given to both currents at once, or the galvanic may be slowly interrupted while the faradio is being rapidly interrupted, or *vice versa*.

A is a "short coil" galvanometer wound in two sections between which a small magnet is suspended on a spindle moving with very slight friction. The number of degrees marked off on the dial plate by the needle bear a proportion to the strength of battery current used.

The current selectors, N, introduce into or remove from circuit any number of cells from 1 to 60. The switches are arranged so that the circuit is never broken while the strength of

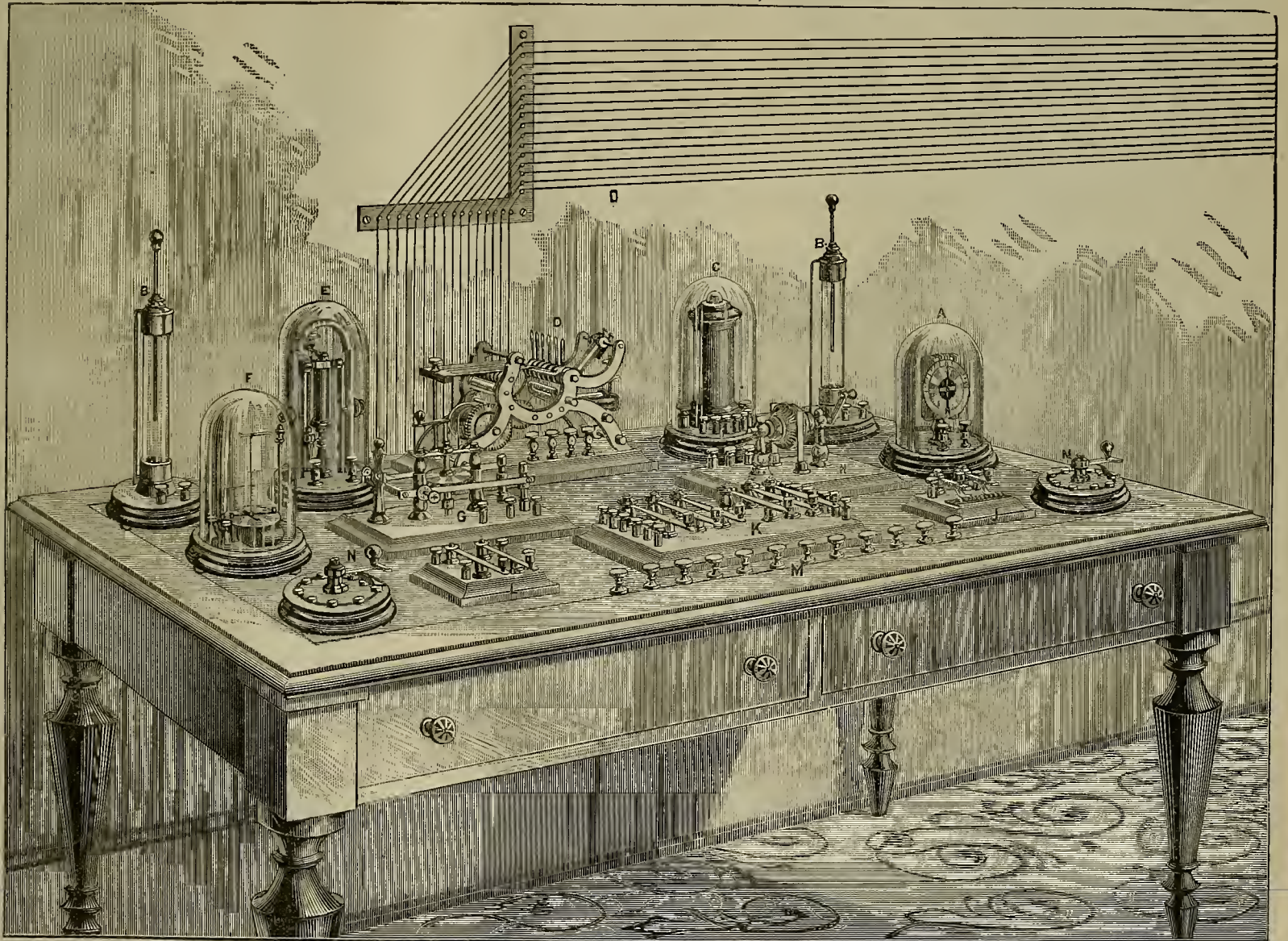
The strata in which the secondary coils are wound, contain various sizes of silk-insulated wires—coil No. 6 containing No. 40 wire, the finest manufactured—carefully insulated from each other, and the entire system of secondary coils literally embedded in an insulating medium.

The switch, J, selects the currents from the secondary coils in such a manner that different combinations of currents can be thrown into two of the binding posts, seen at M. By the use of this switch a current can be selected to suit any particular case without having the trouble of unfastening the conducting wires and without breaking the currents.

brass connected with the positive and negative poles of the battery. Revolving the cylinder causes the brass plates to press alternately upon two upright springs, thereby changing the direction of the currents at every half revolution of the cylinder.

The rapid commutator, G, consists of a cylinder, the halves of which are insulated from each other, mounted on a spindle, driven by a system of wheels. This apparatus will reverse any current as many as 60 times in a second, or by adjusting a set screw, the same apparatus will interrupt instead of reverse.

The astatic galvanometer, F, indicates the



AN IMPROVED ELECTRO-MEDICAL APPARATUS.

ing 4x2 ft., and connected by insulated wires, O, to a stationary battery of improved construction containing 60 cells.

The different pieces composing the apparatus are connected with each other by means of doubly insulated wires, no one piece being independent of the rest of the apparatus. The action of each piece is controlled by suitable switches and can be thrown into or removed from circuit instantly without interrupting the flow of the current.

All the pieces are worked by the current from one battery only and arranged in such a manner that any or all currents generated by the apparatus, whether faradic or galvanic, may be used simultaneously, if required.

Any degree of rapidity to the interruptions

the galvanic current is being increased or diminished. This is an important feature, for by its use disagreeable shocks are avoided.

The faradic rheotome, E, consists of an upright electro-magnet, which attracts three armatures mounted on vibrating springs. By adjusting the springs any degree of rapidity can be given to the interruptions of the faradic currents from the very rapid to that of a slow pendulum motion.

The induction coil, C, consists of a primary coil surrounded by six secondary coils. These coils are wound in planes perpendicular to the long axis of the primary coil, and can be combined in different ways to produce "harsh" or "smooth" currents, thus adapting them to the most sensitive persons.

The rheotome, D, is built upon the framework of a telegraphic register, the clockwork of which gives motion to a revolving cylinder. This cylinder is divided into sections, upon which a series of springs are made to press by a system of levers. The sections contain an insulated material at regular intervals; and with the combination of levers and springs any current, whether galvanic or faradic, may be interrupted from one-half to three and a half times a second. The circuit is regulated through the agency of an electro-magnet, fastened to the framework, all the breaks being made with platinum points.

The commutator, H, reverses all the currents generated by the apparatus. It consists of a cylinder upon which are fastened two pieces of

strength of the galvanic current while passing through the body. It is so sensitive that the current from one small cell passing through the entire length of the body will cause the needle to be deflected several degrees. A "shunt" is added so that the strength of the current from any number of cells can be indicated.

The water-rheostates, B, are used to regulate the currents, acting on the same principle as the "shunts" of a galvanometer, that is, by introducing more or less resistance into an accessory circuit, thereby controlling the current in the principal circuit. With their use, currents may be regulated better than by any other method.

(CONTINUED ON PAGE 172.)



## Notes on the Marine Fishes of the Pacific Coast.—No. 2.

(Read before the California Academy of Sciences by W. N. LOCKINGTON.)

## Fam. Batrachidae.

*Porichthys porosissimus*; Toadfish.—This, the only known representative upon this coast of the family of the toadfishes or Batrachidae, is common along the entire length of the Californian sea board, and although not eaten by the Anglo-Saxon population, figures in the dietary of the Mongolian. It is a shore fish, and may be found at mid-summer under rocks between tide-marks, engaged in the deposition of its ova; which are of comparatively large size.

Like some members of the Sciaenidae, this fish has the power of producing a grunting sound, and does not fail to do so when handled. It may be readily recognized by the rows of silvery pores along its sides and abdomen.

This is one of those fishes that occur on both the Atlantic and Pacific shores of America; but it is curious that its range on the Atlantic coast appears to be limited to regions bordering on the equator, while upon this coast it extends to comparatively high latitudes.

## Trachinidae.

The fishes belonging to, or nearly related to this group, are not abundant upon our coast, and are therefore of but slight economic value. The largest and most important is *Caualotilus anomalous*, Cooper; probably identical with *C. princeps*, Jenyns, a species found at the Galapagos islands. This form, which is said by Cooper to be called "White fish" at Santa Catalina island, where it is tolerably common, has its northern limit at the Bay of Monterey, whence examples are occasionally brought to San Francisco, and, becoming more abundant south of Point Conception, ranges by San Diego along the coast of Lower California to Cape San Lucas; and, if identical with the *princeps* of Jenyns, southward to the equator.

It attains a weight of 10 to 14 lbs., and a length of over two ft., and is, when adult, exceedingly oily, the adipose tissue being especially developed just behind the head, causing the proportions of the adult to differ considerably from those of the young. The soft dorsal and anal fins are very long, the preoperculum serrated on the edge, and the scales small and ctenoid. Prof. Jordan states that many are salted and dried by Americans and Chinese in the southern part of the State, and that it ranks high as a salted fish, and fair as a fresh fish. It feeds largely on crustacea.

Another of the group, perhaps forming the type of a distinct family, is the very curious soft-nosed form described as *Icosteus anigmaticus*. Scaleless, with a row of prickles along the lateral line, and smaller ones on the fin-rays; of a thin, compressed form, and with bones so soft that the body can be folded up like a rag, this fish well deserves the name of *anigmaticus*. Three examples are all that I have seen, and Prof. Jordan did not obtain it during his trip northward, although it is certainly a northern form, and probably lives in deep water. Those in the museum of the California Academy of Sciences were accompanied by a small fish covered with scales, but otherwise evidently nearly related. This has now been described by Prof. Jordan as *Ichthyos lockingtoni*.

## Suckers.

Besides the well-known sucking fish, or Remora, there are four other fishes on this coast which have a right, by reason of the presence of an adhesive disk, to the name of suckers. The sucking apparatus of the Remora is upon the back of the head, but that of all the others is upon the abdomen, and is formed, to a greater or less extent, by the ventral fins, which are altered for the purpose. Three of these suckers are found upon the coast of California, and belong to two different families, characterized by the structure of the sucker. Two of them belong to the *Liparidae*, and have the ventrals transformed into the center of a sucking disk, which is completed by a margin of skin. In these species the ventrals are of course united, while the rays of those fins form so many cross bars upon the sucking disk.

In the remaining species the ventrals are widely separated, the entire width of a depressed, flat-bottomed abdomen intervening between them. The front part of the sucking disk, which is very large, is formed by the ventrals, but the larger portion is a cartilaginous expansion of the bones called coracoid bones, which form part of the shoulder girdle or thoracic ring, to which both pectoral and ventral fins are attached. These coracoid bones are partly free, and extend behind the base of the pectorals. The two *Liparidae* (*Liparis pulchellus* and *Neoliparis mucosus*) have a long dorsal and anal fin, without any stiff spines; the top of the head is depressed, and they share with the Cottidae the character of having the suborbital bones connected with the preoperculum. In these fishes the connection is formed by a slender process extending backward from the former bone. In *Liparis pulchellus* the skin is exceedingly loose and flabby; the dorsal and anal fins are continuous with the caudal. In the other species the tail fin is distinct from the other vertical fins, and the skin is less loose. *L. pulchellus* is, when fresh, marked by numer-

ous longitudinal or netted bright brown lines. In the third species, *Gobiosoma reticulatus*, the front part of the body is very much depressed, and very wide, to accommodate the large sucking disk, while the hinder part, on which both dorsal and anal fins are situated, is compressed and tapering. The last species is found on the ocean beach along the entire coast of California; the two first occur within the bays of San Francisco and Monterey. *Liparis pulchellus* is abundant in some localities, and is occasionally brought to our markets.

Gillichthys Mirabilis (Cooper), the Long-Jawed Goby.

This fish, first noticed by Dr. Cooper at San Diego, has since been proved to be one of the most abundant of species from Cape Mendocino southward. In lagoons, mud-flats, and along the borders of the tidal creeks it is the commonest of fishes, and numerous little examples sent to our local museum from artesian wells have proved to be its young. The general appearance of the young is very different from that of the adult, in consequence of the great development of the jaws in the latter. The very young *Gillichthys* looks like any ordinary Goby, with ventral fins united into a funnel-like disk, but as age increases, so does the length of the maxillary or upper jaw-bone, which finally extends backward along the sides of the head to beyond the insertion of the pectoral and ventral fins. This long fold of skin and cartilage is free from the side of the head, and not improbably serves as a reservoir of water to keep the gills moist when, from a low tide or other causes, the water fails for some time to reach the holes in which the species dwells. The Chinese dig up this fish from its hiding-place in the mud, and eat it with relish, and white people who have tasted it second their opinion.

One of the Blennidae of this coast—*Neoclinus satiricus*—has a backwardly prolonged jaw of somewhat similar structure.

## Agonidae.

The fishes of this family are neither sufficiently large nor of sufficiently common occurrence to be of value as food to man, but their bizarre forms and the singular armature of their bodies render them objects of interest. The body is sheathed with several, usually eight, series of plates, forming as many angles, so that the name of the family—Agonidae—without angles, appears to have been given in jest. The upper and lower series are usually confluent anterior to the caudal fin, and the lower side of the body, anterior to the pectorals, is variously protected. The angles of the plates are often more or less spinous, and the bony head is furnished with spines or barbs.

In the genus *Podothecus* the upper jaw overhangs the lower. Three species of this genus occur upon this coast—viz., *P. acipenserinus*—a form long known to science, and easily recognized by the numerous barbs beneath the chin; *P. vulsus*—first described by Prof. Jordan from a specimen found in the markets of San Francisco, and characterized by numerous spines upon the head; and *P. trispinosus*—described by myself ("Proc. U. S. Nat. Mus., 1879") from specimens found in the markets of this city. The last is smaller than either of the preceding, not exceeding three inches in length.

Of the genus *Brachyopsis*, in which the lower jaw is longer than the upper, and reaches to the upper surface of the head, two species occur on the coast of California, both of them reaching a length of about six inches. *B. verrucosus* was first described from numerous examples taken in Drake's bay, and has since been found in San Francisco market, and *B. zyosternus*, I. X. G., is common in Monterey bay.

In the former species the breast is protected by several roundish plates, giving it a warty or verrucose appearance, while in the latter the same region is covered with prickles.

## Cottidae.

At least eighteen species of Cottidae, or bull-heads and sculpins, are known to occur upon the coast, or in the rivers of California, yet only one of the tribe—*Scorpenichthys marmoratus*—is habitually sold as food. This species is common in the Bay of San Francisco. Its young are frequently brought to market mingled with those of rock-cod, and furnish amusement and pabulum to the boy who angle from the wharves, and the adults are brought, though in small quantity, into our markets with tolerable regularity. This species ranges along the entire Pacific coast of the United States. Two species of the tribe are confined to fresh water, but all the others are marine. Some of the species are scaleless, while others are more or less covered with prickles, or with bands of rough scales of rather large size. The genus *Oligocottus* contains three species, which are among the smallest of fishes.

A curious member of the tribe is *Ascelichthys rhodorus*, lately described by Jordan and Gilbert from Washington Territory, and since found at Gualala, Mendocino county, by Mr. Rivers, Curator of the State University Museum. This little fish has no trace of ventral fins, and in this respect differs from every other cottoid yet known.

The common Sculpin or Drummer, *Leptocottus armatus*, is abundant everywhere along the coast in lagoons and sheltered bays, especially on a muddy bottom, and is sometimes dried by the Chinese, who do not esteem it. The Chinese also take *Hemilepidotus spinosus*, the Cap-eone, or set lines in rather deep water at Monterey, where it is tolerably common, but they do not consider it choice food. When the head and skin of a Cottoid are removed, there is com-

paratively little left, and that little is coarse and dry.

An old friend is the

## Sword Fish.

*Xiphias gladius*, the same sword fish that is known to the dwellers around the Mediterranean sea, and the same that is popularly supposed to molest the whale. That a sword fish which can run its long upper jaw, impelled by the muscular force of a body 10 or more ft. in length, through the side of a ship, could hurt a whale if it chose, is evident, but the real enemy of the whale is the grampus, a toothed cetacean, second only to the whale in size, since it ranges from 20 to 30 ft. in length.

The occurrence of this fish upon our shores has been noted by Prof. Jordan, who saw one from the deck of a steamer off Santa Monica, so that it may be included in the catalogue of those fishes which extend northward at least as far as Point Conception. It is occasionally seen by fishermen at Santa Catalina island, but is not taken, as it does not come in to the shore nets.

## Family Cyprinoclonidae.—Toothed Minnows.

This large family, well represented though it is in America, has but two members in our State, both confined to the extreme southern portion of it. The species inhabit fresh or brackish water, lagoons, muddy lakes and similar situations.

The native species are valueless as food. In all the tribe the dorsal fin is placed far back, upon the caudal part of the body. The sexes frequently present some differences. *Fundulus parvipinnis*, the better known of our two recorded species, was found by Profs. Jordan and Gilbert, as far north as San Luis Obispo, and it is common at San Diego. It does not exceed three inches in length. The male has larger fins than the female.

## Families Synodontidae, etc.

A group of more or less related families, distinguished on the one hand from the salmon tribe by the exclusion of the maxillary bones from the margin of the upper jaw, by the absence of an air bladder, by the fewness of the pyloric appendages, and by the exclusion of the eggs by means of oviducts, was named by Dr. Gunther *Scopelidae*. Later naturalists have divided this group into four. From the herrings these fishes are distinguished by the presence of an adipose or fatty dorsal fin, and by the rounded abdomen. In the herrings the upper jaw is formed partially by the maxillaries.

All the members of this group of families are inhabitants of the open ocean or of the ocean depths, and it is among these and other deep sea tribes that further ichthyological discoveries upon this coast must be looked for.

The four known species, none of which are sufficiently abundant to be of value, are *Synodus lucioceps*, which is occasionally taken in San Francisco bay and ranges along the Pacific coast of America; *Sudis ringens*, at present known only from a single specimen taken by Prof. Jordan from the stomach of a *Merluccius*, itself in the stomach of an albacore, *Alepidosaurus borealis*; and *Myctophum crenulare*. The first reaches a length of 18 inches, is sometimes brought to the markets of San Francisco, and is often taken with hook and line from the dock at Santa Barbara. Together with all the rest of its family (*Synodontidae*) it has a short dorsal fin, placed in or near the center of the length of the back. In *Sudis* (*Paralepidus*) the dorsal is on the hinder part of the body, while in the *Alepidosauridae* it occupies nearly the entire length of the back. The latter are predatory fishes of considerable size, furnished with formidable teeth of very unequal size. These teeth are constantly changing, so that the dentition is not exactly the same in any two specimens. Only the head of our species is known, but from its size it is evident that the entire fish must be three ft. or more in length. It is occasionally driven ashore after storms. The only specimen of *Myctophum crenulare* yet known was taken this year from the stomach of an albacore in Santa Barbara channel.

P. S.—Prof. Jordan has discovered that the salmon (*Oncorhynchus*), which has been called *O. kemmerlyi*, and identified with the "red-fish" of the Indians, is really the young male of *O. nerka*, the "blue-back."

NEW DISTRICT.—The staid people of Riverside, says the Press, have an excitement. On Wednesday last David Meacham brought samples of rock to Riverside which looked rich. At first it attracted but little attention, but by Thursday afternoon it was rumored that rich rock had been discovered just south of the arroyo, above the upper canal. Free gold in the rock was a common occurrence, and many who got into the secret started for the rich diggings. Night came on, but the prospectors stood by the work and did not even sleep on their arms. All night long, with lantern in hand, the work of tracing the ledge and locating claims was continued. Friday morning others went to the new El Dorado, and to-day the hills are full of prospectors. It is said that some of the ore being crushed in a crude manner yielded \$2,000 to the ton. This is supposed to be the northwestern extension of the Pinacarta mines, and if the lead continues in the same direction, still farther, it will pass right under the town site of Riverside. In fact, during the past few days, rich rock has been found within the town limits.

THE hydraulic pumps for the 2,400 ft. level of the Chollar-Norcross-Savage shaft are arriving and will be put in as fast as possible. A new cable for this shaft has also arrived.

## Stiles' Quartz Mill.

A Nevada City Transcript reporter has visited W. C. Stiles' quartz mill on Gold Run, near the railroad depot, and witnessed the operation of the very novel machinery connected therewith. The mill, which was invented by Mr. Stiles, has but one stamp. The following description of its workings will be found interesting by all miners or mill men:

The frame or wood work is similar to that of any other battery, as are the cam and camshaft. Upon the stem or stamp is a sleeve, which is operated by a beveled gear, and is driven by an independent belt. This sleeve carries a shoe bent like a sickle, which revolves inside the battery and serves as a scraper to draw the quartz under the stamp. The mill acts as a rock-breaker, reducing the ore from dimensions of four or five inches in diameter to the size of an ordinary marble, or smaller. The capacity of it is shown to be from 12 to 15 tons per day on this sized material.

The mass is then passed through a pulverizer made in the shape of a cylinder about eight inches wide and 24 inches in diameter. This is hung on a shaft and is driven about 300 ft. per minute. Upon another shaft is a wheel one-half the diameter of the cylinder, which is driven in the same direction, but much faster—say 600 ft. per minute. This wheel and the inside of the cylinder are of V shape, one inside of the other, and matching. The wheel-shaft is hung in sliding boxes, and can be made to mesh with a force of one, two or twenty, as the hardness of the quartz may demand. Anything passing between these dies and the wheel can be reduced to any degree of fineness required. The capacity of the small grinder on exhibition is five tons per day, and requires but two-horse power to operate it. It can be driven by one horse and do proportionate work. The inventor claims that by making the shafting larger, four, six or ten horses may be employed, reducing proportionately larger amounts. In order to accomplish this, the quartz, which is now put in in particles the size of beans, would be made about the size of marbles, and the speed at which it is run would also be increased from 600 ft. per minute to 1,000 or 1,200 ft. These changes, it is said, would quadruple the amount reduced.

The entire machine weighs but 1,500 lbs., frame and iron work complete. It is, therefore, readily transported by mules from one point to another, while the cost of construction is merely nominal.

Mr. Stiles says, further, that he has found the pulverizer to be an excellent device for grinding wheat and barley, thus rendering the invention one of importance to farmers as well as miners.

EXTRAVAGANCE IN MINING CAMPS.—The Rocky Mountain Mining Review in a recent number contains a sensible article on extravagance and waste in mining camps, in which it says: "It is necessary now in order to insure success, that mining should be carried on in as systematic manner as any other business; but it is a well-known fact that it is not every one that is conversant with mining that knows well of the thousand and one things which bring the net results down far below what they should be. We have not the room to print, neither do we care to speak of the many serious wastes caused by negligence or ignorance on the part of superintendents and managers. Several years since, with great flourish of trumpets, an English company came here and invested heavily in the mines at Hall's Gulch. Fine tramways and elegant houses were built, grounds were laid out that would have been a credit to a Rothschild, but the treasury was at last emptied, and the stockholders refused to come down with more capital. Work was shut down, and to-day Hall's Gulch is not one-tenth as well known and not producing one hundredth of the amount of ore it would have been had the work been properly done. Recently a gentleman leased one of the dumps of a mine in that gulch and has been digging out the ore and shipping it, and after he has paid all expenses of working, shipping and milling the ore he makes over \$50 per ton as net profit."

HARSHAW DISTRICT, ARIZONA.—We learn from Mr. W. B. Caldwell, of Harshaw, that affairs in that camp are assuming a more lively aspect than ever before. Work on all the mines is being vigorously prosecuted, and the prospect of the output is flattering. The Hermosa or Harshaw mine is working a force of about 75 men. The mill works about 95 tons of ore per day. Last month nearly 30,000 tons were worked. The mill is a model affair. It is provided with the most improved machinery and apparatus, requiring but one-fourth the usual number of hands to run it. The Trench mine has the finest hoisting works in the Territory. The main shaft is down 300 ft.—150 ft. below the deepest point in the old workings. The Alta mine has about 3,000 tons of ore on the dump. One hundred tons are to be hauled to the Boston mill, on the San Pedro, for a working test, which will decide whether a mill or furnace is necessary to reduce the ore. A great deal of work is being done at Mowry camp, and some splendid ore is being brought to the surface.—Citizen.

THE Superintendent of the Best & Belcher and Gould & Curry joint shaft writes that he expects to have the pumps in place and everything in readiness for sinking by the 1st of April.



MECHANICAL

PROGRESS.

Brazing and Soldering.

The term soldering is generally applied when fusible alloys of lead and tin are employed. When hard metals, such as copper, brass or silver are used, the term brazing (derived from brass) is more appropriate.

In uniting tin, copper, brass, etc., with any of the soft solders, a copper soldering-iron is generally used. This tool and the manner of using it are too well known to need description. In many cases, however, the work may be done more neatly without the soldering-iron, by filing or turning off the joints so that they fit closely, moistening them with soldering fluid, placing a piece of smooth tin-foil between them, tying them together with hind wire and heating the whole in a lamp or fire till the tin-foil melts. We have often joined pieces of brass in this way, so that the joints were quite invisible. Indeed, with good soft solder, almost all work may be done on a lamp without the use of a soldering iron.

Advantage may be taken of the varying degrees of fusibility of solders to make several joints in the same piece of work. Thus, if the first joint has been made with fine tinner's solder, there would be no danger of melting it in making a joint near it with hismith solder, composed of lead four, tin four and hismith one; and the melting point of both is far enough removed from that of a solder composed of lead two, tin one and hismith two to be in no danger of fusion during the use of the latter.

Soft solders do not make malleable joints. To join brass, copper or iron so as to have the joint very strong and malleable, hard solder must be used. For this purpose equal parts of silver and brass will be found excellent, though for iron, copper, or very fusible brass, nothing is better than silver coin rolled out thin, which may be done by any silversmith or dentist. This makes decidedly the toughest of all joints, and as a little silver goes a long way, it is not very expensive.

For most hard solders borax is the best flux. It dissolves any oxides which may exist on the surface of the metal, and protects the latter from the further action of the air, so that the solder is enabled to come into actual contact with the surfaces which are to be joined. For soft solders the best flux is a soldering fluid which may be prepared by saturating equal parts of water and hydrochloric acid (spirit of salt) with zinc. The addition of a little sal-ammoniac is said to improve it. In using ordinary tinner's solder, resin is the best and cheapest flux. It possesses this important advantage over chloride of zinc, that it does not induce subsequent corrosion of the article to which it is applied. When chlorides have been applied to anything that is liable to rust, it is necessary to see that they are thoroughly washed off and the articles carefully dried.—*Indianapolis Mechanical Journal.*

**WHY SAWS HEAT.**—One whose lot it has been to hang and put into operation hundreds of circular saws, and traveling from mill to mill trueing saws and putting the machinery in order, says: "Saws heated at the center are almost invariably the fault of either the mandrel heating, or the collars not being properly turned, or sometimes the saw may not be in proper line with the carriage, or the track out of order. Saw heating at the rim and not at the center, is generally the fault of the saw leading too much into the log, causing it to hear too hard against the outside guide. The above defects are among the most prominent. Often the machinist in putting in the lug-pins of a mandrel will turn them too large, thus drive them into the collar with a hammer, and swell the metal around the pins without noticing the defect. In such a case, the saw will only have a hearing at a small surface around the pins, and never fit nor hang true until the metal is chipped or filed off level with the face of the collar. Often the collars will not run true; this defect should be corrected at once."

**HIGH-SPEED ENGINES.**—The *Mechanical Engineer*, of January 22d, has the following paragraph: "The Buckeye Engine Company, Salem, have in hand a non-conducting engine for Thomas Edison, Menlo Park, New Jersey, intended to run at 450 revolutions per minute, and develop 100 to 150 indicated horse power, at a pressure of 125 lbs. The cylinder is 10 inches in diameter by 12-inch stroke, and will be connected directly to the dynamo-electric machine it is to drive." When Porter commenced to run his 10 by 12 engine 216 to 224 revolutions, 10 years ago, most people thought he was crazy, and some did not hesitate to say squarely that "Porter had turned fool." This result seems to be that Porter was neither foolish nor crazy, from the fact that half a dozen persons are now building high speed engines, or something which they call high speed.

An invention has recently been patented to prevent the explosion of steam boilers by placing a partition across the boiler slightly above the water line, providing an opening through this partition, which is adjustable, and through which the flow of steam can be regulated to be equal to the average intermittent flow required for the engine. It is claimed that this prevents dangerous variations of pressure on the surface of the water, hence preventing explosions.

METEORIC IRON.

SCIENTIFIC

PROGRESS.

In connection with the above we may call attention to an article which appeared a few years since in the *London Engineer*, on the recent improvements which have been made in the manufacture of iron, in which it was correctly stated that the truth is now rapidly gaining ground that, wherever mechanical strength is desired, an alloy is preferred to a pure metal. One of the greatest obstructions to the mechanical value of iron, is its tendency to crystallize. Whether this article be a monster gun or a ship's cable, the result is the same. The tendency of iron thus to crystallize may, unquestionably, be prevented by the admixture of other metals. In almost every direction, nature has placed certain metallic masses, to which the name "meteoric iron" has been given, on the supposition that these masses have fallen from the atmosphere. The composition of meteoric iron, wherever found, is chiefly of iron and nickel, the latter varying from 2% to 10%, with small quantities of cobalt, and, it is said, chromium. Science has made artificial meteoric iron, and it has been tested. Its qualities have proved identical with those of the native compound. In addition, it is more ductile, and has more tenacity than pure iron, and is not so liable to rust or oxidize. Possessing such qualities, meteoric iron is certain to become an important branch of industry. A mixture of 93 parts of iron and 2 of nickel, has all the peculiarities of best meteoric iron. Some 20 years ago an ore of sulphur of arsenic, devoid of arsenic, was found in Inverary, in Scotland, and, by its means, meteoric iron has been made of the best quality.

The Theory of the Bessemer Process.

There is nothing like knowing the reasons of things. A writer in a Western journal thus explains the decarbonization of iron in the Bessemer converter: Some inquisitive reader may be desirous of knowing "why there should be this effect of the air-blast through the melted cast iron?" Webster says that "it burns out a portion of the carbon." We say that the air, forced through the molten metal, blows out its impurities. The changed appearance of the flames from a dead red to a clear white light indicates this fact.

Says another: "Why add spiegeleisen?" After forcing the air through the liquid iron it becomes more or less porous. The spiegel contains a large per cent. of manganese. This attracts, gives density, cohesion and tensile strength to the compound. Some illustrate the change by the formation of a seedling powder. In this the parts separated are an acid and an alkali. Combined it is a new liquid—differing entirely from its component parts. Now, it cleanses and purifies the stomach. So the cast iron, freed from its impurities, and in a fluid condition, the spiegel, highly charged with manganese, and, also in a fluid state, immediately combines all its properties with the iron, and the result is a fine quality of steel, possessing great hardness and sufficient tensile strength for the best kind of steel for railroads.

**A SOLDERING fluid** which does not occasion rust is prepared in the following manner: Small pieces of zinc are immersed in muriatic acid and left in it until the acid is saturated with it, which may be known by the cessation of ebullition of the acid, and also by the zinc, after that stage, being left undissolved; add spirits of ammonia, about two-thirds of the quantity of the acid; thin with a little quantity of rain-water. When, at the time of adding the zinc, if the muriatic acid is heated to a low degree, the solving of the zinc will be achieved sooner. This fluid does not cause rust on iron or steel, and is excellent for all purposes, even for tinning.

**INTERESTING EXPERIMENTS.**—A very important and valuable series of experiments on the strength of wrought iron columns has been made by Mr. G. Bressacren. It includes a large number of columns made by the Union Iron Mills, Pittsburg, by the Cleveland Rolling Mill, Cleveland; the Phoenix Iron Co., Phoenixville; the Pencoyd Iron Works, Philadelphia, and the Ohio Falls Iron Works, New Albany, Ind. The paper was read before the American Society of Civil Engineers, and is published in the last December number of the transactions of that body.

**SULPHUR IN LUBRICATION.**—It has long been known that sulphur cools a hot bearing, but the reason why is doubtful. Von Heeren states that the fine metal dust formed when a journal runs hot, and which strongly acts upon both journal and bearing, forms a sulphide with this sulphur. This compound, which grows soft and greasy, does not cause any appreciable amount of friction. Sulphur and grease in combination are in regular use on board the steamers of the North German Lloyd.

**NEW STEAM ENGINE INDICATOR.**—A new indicator has been invented in Norway, by which the ordinary motives are reversed. The card is stretched upon the quadrant of a cylinder, which receives the reciprocating motion from the steam in the cylinder, and the pencil is attached to mechanism connected with the piston rod. The pencil can be moved sideways so that a continuous number of diagrams can be taken without moving the card. It is connected in the usual way with the steam cylinder.

SCIENTIFIC

PROGRESS.

Electrical Shadows.

Some curious phenomena—electrical shadows so-called—have been lately described by Herr Holtz to the Gottingen Academy. They are best got by fixing to one discharge rod of a Holtz machine a large concave disc with a piece of silk without wrinkles, adhering to it by electric action; at the point of the other rod, placed opposite, appears, when the machine is worked, a small, feeble, luminous star, and on the disc a luminous circle, and the shadows appear on the latter when objects are interposed. That they are not optical shadows is proved, *inter alia*, by the fact that not all objects give them. They are produced in general only by conductors or semi-conductors; insulating bodies, when small, give no shadow; when large they may give some shadow at first, but this gradually goes out as the action of the machine is continued. It makes no difference whether the conducting bodies are connected with the earth or insulated. The shadow-forming power is to be measured not only by the darkness of the image but by the magnification. Herr Holtz tried pasteboard, ebonite, silk, linen, knitting-needles and glass rod or tubes; the former he used in the form of strips, crosses and rings. The size and form of the shadows are affected by various things. The shadow is larger or smaller according as the body approaches the point or the large surface. It enlarges, too, outwards from the center of the disc, so that the shadow of a strip of uniform width is narrowed in the middle. It is further notable that, to a certain limit, strip gives the same shadow, whether it is placed with its broad side or narrow edge toward the disc. A system of strips placed edgewise, gives the same shadow as a homogeneous piece. Various instructive experiments may be contrived thus, a cross of pasteboard and ebonite gives only the shadows of the pasteboard, but by breathing on the cross a full cross shade momentarily appears. A glass rod with one end made conducting by heat gives a partial shadow, which gradually disappears in cooling; and so on. Herr Holtz does not at this stage say much as to what the phenomena mean.

**ADULTERATION OF SALICYLIC ACID.**—The large use which is now being made of salicylic acid, has recently led to its very common adulteration. According to the *Textile Colorist*, sugar, starch, sulphate acid of potash, sulphate of lime and silica are substances entering into its adulteration. Phenol, sulphuric and muriatic acids, even salts of soda, can also be used for this sulphurification. To detect the presence of phenic acid in salicylic acid, or in salicylate of soda, one gram of concentrated sulphuric acid in 20 centigrams of salicylic, being well mixed, gives a preparation which demonstrates the adulteration by the following method: Add to this preparation one or two drops of nitrous sulphuric acid, which can be obtained by mixing 20 centigrams of nitrate of potash in 30 grams of sulphuric acid. If any greenish coloration takes place in the contact, it indicates the presence of phenol. Some nitro-prussiate of soda, in powder, put into the first preparation, produces a reddish or pinkish color, according to the proportion of phenol. Nothing of this kind takes place when the product is pure. Any azotates will reach the above, showing a dark color when phenol is in it; and if neutralized by ammonia, a yellow dye is produced with some chance of usefulness, as its tinctorial power is quite considerable.

**LIGHT AND HEAT** have for some time been regarded as essentially the same thing—being only different manifestations of the same radiant energy; but it is only quite recently that this theory has been satisfactorily demonstrated. By the use of a Rutherford grating and a delicate thermal balance, Prof. Langley of Alleghany (Pa.) Observatory, recently succeeded in obtaining for the first time full and exact measurements of the distribution of energy in a pure spectrum, where no lens or prism had been used, and of fixing its relative amount as determined accurately by the wave-lengths of light in all parts of the visible spectrum and in the ultra red. The essential result is of high theoretical value. It is that heat and light as received from the sun are now experimentally proved, so far as such measurement can prove it, to be in essence the same thing. The old delineations of essentially different curves representing heat and light must be banished hereafter from text books. The old views on this subject can no longer be maintained even by European men of science, who are prepossessed in their favor. This result, fulfilling what was almost a prophecy when it was made, a quarter of a century ago, by the elder Draper, and being due largely to means which science owes to Mr. Rutherford, may, if obtained, be most fairly claimed as largely due to the two Americans whose names have just been cited.

**ELECTRICAL TEST FOR OILS AND SILKS.**—Prof. Palmieri, of Naples, has recently constructed an apparatus which allows the purity of oils to be judged of by the resistance that they offer to the passage of electricity. Olive oil—a poorer conductor than any other—is taken as the standard of comparison. The apparatus may also serve to reveal the presence of cotton in silk fabrics; for a very small portion of cotton in silk tissues greatly increases the conductivity of the latter.

Electric Light Good for the Eyes.

When the electric light began to be used in our shops, factories and places of amusement, it was confidently asserted by its opponents that so dazzling a light must be injurious to the eye. The objection seemed plausible at least, although the light when diffused seemed to have the quality of bright moonlight, which is the reverse of irritating. People would persist in looking at the source of the light, and as the early lamps were far from steady, the observer's eyes suffered both from the intensity of the light and the sudden and large variations in the quantity of it. It appears, however, from the experiments recently made by Professor Cohn, of Breslau, whose name is so familiar in connection with the investigation of color blindness and other optical defects, that our eyes will be benefited rather than hurt by the new method of lighting, and it is obvious that with incandescent electric lighting the advantages will be still more marked.

While testing the influence of electric light on visual perception and the sense of color, Dr. Cohn proved, he thinks, that letters, spots and colors were perceived at a much greater distance under electric illumination than by gas light or even daylight. Compared with daylight, the electric light increased the sensation of yellow 60 fold, red 6 fold, and green and blue about 2-fold. Eyes that in daylight or gaslight could perceive and distinguish colors only with difficulty were much aided by the electric light, and the visual perception was much strengthened. In all cases of distant signalling Dr. Cohn believes that the electric light will prove exceedingly and especially useful.

**NEW USE OF TUNGSTATE OF SODA.**—Prof. Sonnenschein, of Berlin, some time back found that when glue in thick solution is mixed with tungstate of soda, and hydrochloric acid is added, there is thrown down a compound of tungstic acid and glue, which at from 86° to 104° F. is so elastic as to admit of being drawn out into very thin sheets. On cooling this mass becomes solid and brittle, but on being heated it becomes soft and plastic. This material has now been employed as a substitute for alumen in fixing aniline colors in calico printing, and it has been tried in tanning, but produces hard and stiff leather. As tungstic acid renders fabric incombustible, its use in calico printing is a valuable feature. How far it is applicable in the manufacture of paper remains to be seen. Tungstic glue is recommended as a lute and cement. It may also have an application in the manufacture of billiard balls, knife handles, and as a substitute for India rubber.

**PREHISTORIC ENGLAND.**—Probably no man has more thoroughly explored or more carefully studied the ancient caves of Great Britain and their contents than Prof. W. Boyd Dawkins, F. R. S., who lately delivered a public lecture in London on the early inhabitants whose traces are discoverable in these caverns. Among the interesting results of his investigations he mentioned that the horse was used for food by these primitive people, and probably also the dog. The dog of those times appears to have been a much larger animal than the average dog of the present day. Fire was obtained by striking a light from the familiar mineral, iron pyrites. The potter's wheel does not seem to have been known, but pottery was made by hand. The cave implements show that the prehistoric inhabitants ground corn, and engaged to some extent in mining operations.

**CARBONIC ACID GAS IN THE ATMOSPHERE.**—In a lecture recently delivered by Prof. Ira Remsen, at Baltimore, that scientist maintained that air may contain 1-20th of its volume of carbonic acid gas without producing evil effects—a conclusion by no means novel, but sustained by such chemists as Berzelius and Pettenkofer. He stated that the most delicate tests failed to reveal the presence of carbonic oxide in the atmosphere of rooms heated by furnaces or by cast-iron stoves. According to his opinion there may be other pernicious gases in the air breathed, but there is no reason whatever why the deleterious effects should be attributed to carbonic oxide.

**ACTION OF VEGETABLE ACIDS ON TIN.**—Prof. Chas. E. Muoro, of Annapolis, states that the ordinary fruit acids, such as those contained in apples, tomatoes, rhubarb, lemons, etc., all act upon tin. Some cider which he examined, and which had been stored in a tin fountain, contained 117 milligrammes of metallic tin to the liter in solution. One case was given where persons eating fruit preserved in tin cans were made violently sick, and tin only was found in the fruit. Corrosion of tin pipes by water was referred to, and it was suggested that the corrosion was due to the vegetable acids in the water.

**THE STARS.**—About 5,000 stars are visible to the naked eye. There are 18,000,000 stars in the Milky Way. Even the stars that we call fixed are in constant motion. Arcturus moves through space three times as fast as the earth, but it takes a hundred years to move the eighth part of the apparent diameter of the moon.

**A CURIOUS FACT.**—It is a curious fact, lately noted by M. Bounguy, that if boiling water be projected on an incandescent surface, its temperature falls at once to 97° C. He is of the opinion that this is due to work expended in production of the spheroidal state.







Check, has let a contract to run a tunnel to tap the ledge on the Martha Ann quartz mine, on Otter Creek divide. They will tap the ledge some three next week, when they may expect to hear of a rich development.

D. Gibbs and F. W. Hubert located a quartz claim on the first of last month, on Dark canyon, about a mile from town, which they are prospecting with favorable results.

The Knox boys are prospecting a seam on Lousey gulch, which looks fine. That has been one of the richest gulches in these parts, and the boys may find a strike if they are lucky.

Frank Chizek has located a quartz mine on the north side of Canyon creek, and is getting some good prospects. We learn of several more quartz claims being located since last week, in this vicinity.

**INYO.**  
GOLD SHIPMENT.—Independence, Mar. 5: A shipment of gold, amounting to 291 ounces, valued at \$2,775, was made on the 2d inst. through Wells, Fargo & Co.'s office at Independence. It belonged to Moreno, Otero & Montana, and came from the Mexican camp, Beveridge district.

BISHOP CREEK.—Quite a little excitement has occurred on Bishop creek over some gold ledges situated about 12 miles east of the town, in the west foothills of the Inyo range.

**NEVADA.**  
STARTER UP.—Grass Valley Union, Mar. 5: Many of the mines in this district, which were being prospected in the early part of the winter, and which looked very promising, were obliged to stop work on account of the great loss of water upon them. Most of them have now started up again, and the chances are favorable for work continuing upon them right along without interruption, and Grass Valley will have more mines working the coming summer than for some years past. The whole outlook of the district is favorable, and it will not be long before some more dividend payers will be added to the list.

SCOTIA MINE.—The Scotia mine, which has been idle for the past few weeks, on account of the great quantity of water in the shaft, and which the small pumps were unable to handle, started up yesterday. Supt. Stoddard will cause a large pump to be placed in the mine immediately, and the work of developing the property will be prosecuted in earnest. Several carloads of heavy machinery are now being shipped from Virginia City, and will arrive in a few days. This company have a fine ledge in the mine, and do not propose to let water get the best of them another season, but will be prepared with large pumps to meet any such emergency. The starting up of the Scotia will give employment to quite a number of men.

THE AMERICAN MINE BLAST.—Transcript, Mar. 3: At 6 o'clock Monday evening a blast of 24,000 lbs. of Judson powder was set off in the American mining company's claims, 1 mile west of San Juan.

MINING CLAIM SOLD.—Eskrine & Craig have sold their possessory title in a quartz claim adjoining the Leecompton and Lackawanna, above the Murchie, to John W. Brodie.

THE SMARTVILLE MINES.—Smartville is one of the liveliest hydraulic mining camps in the State. The Excelsior company are employing 500 men in their claims there, and about 20 more on the company's ranch a few miles below. The Blue Point mine works about 60 men.

THE RACQUET QUARTZ MINE.—County Surveyor Hartwell and Deputy Surveyor Englebright have located 3,000 ft. along a ledge 15 miles northwest of Newtown, and in the same range as the Buelow quartz claim. They call their claim the Racquet. Several shallow shafts have been put down on the ledge, which is from 2 to 3 ft. thick, and the ore found at a depth of 20 ft. assays from \$15 a ton upward. The croppings are on the brow of an abrupt hill, and by running a tunnel in 500 ft. backs of 300 ft. can be obtained. By pushing the tunnel in further, the backs can be increased to 400 ft. The Racquet is a very encouraging prospect, and the owners propose making arrangements to develop it.

THE THRUER MINE.—The combination that some time since was made between the Thuer mine, on Massachusetts hill, Grass Valley township, for \$25,000 from M. C. Taylor, propose to immediately pay up for the mine, although their time is but half expired. They have recently struck a fine 18-inch ledge running north and south from the direction of the old Rocky Bar mine, which bounds the Tribute claim on the north, toward the Ford & Mullen bonanza, which bounds the Tribute on the south. The Tribute mine also lies but a few hundred ft. from the New York and New Rocky Bar mine, and consists of 1,500 ft. of the Black Lead ledge, for which a patent is being issued.

A STAW FOR THE "BEX."—A certain hydraulic mine, not far from here, has just cleaned up \$17,000. Of that amount \$15,000 is paid to Nevada City merchants for supplies of various kinds. Those supplies were mostly purchased from Sacramento dealers, and the retailers will have to repay to the merchants at Sacramento so long as it is to their interests to do so.

NEVADA CITY MINE.—The 3d ledge of the Nevada City mine is producing some high-grade ore. The 2 chutes in south part have been looking exceedingly well for several days, one being heavily charged with sulphurets and the other showing considerable free gold. An equally promising body of ore is just being opened into in the north part of the ledge.

THE JULIA.—Herald, Mar. 5: The Julia mine, situated down Deer creek near the Morrifield, is said to be yielding some good rock. The owners of the property are Wm. Sloan and Phil. Dunn. They are running a tunnel in on the ledge, which has now reached a distance of 200 ft. The width of the ledge is about 1 ft.

THE MURCHIE.—The machinery connecting with the new shaft of the Murchie mine will be started up next week. The shaft has been arrived at the depot, and is awaiting shipment to the mine. It is a steel cable, 2,000 ft. long, and is 3 1/2 inches in diameter. The company likewise sent to San Francisco for 2,400 ft. of Oregon pine lumber, 6x6, to be used for the guides of the cages. It is claimed that it is far superior to sugar pine.

A GOOD CLEAN-UP.—A part clean-up of 27 days' run was made this week at the hydraulic diggings of Messrs. J. C. and W. C. Smith, of Scott's Flat. The yield was between \$2,500 and \$3,000. During the past week the owners have used about 400 inches of water per day. The prospects of this mine are said to be very encouraging. The owners are deservingly of success.

IRON.—Foothill Tidings, Mar. 5: The Iron mine, near the lower line of this county, is assuming large proportions, and will be a great benefit to that rural region by the large number of men employed. The company has expended about \$150,000, and as soon as the road is completed good order for the hauling of charcoal, active smelting operations are expected to begin.

**PLACER.**

RUNNING.—Placer Times, Mar. 3: Mr. J. L. Gould, Superintendent of the Gold Run ditch and mining company, has been here for the last few days, and is at work in his mine, and taking advantage of the large supply of water now in the company's ditch, putting it all to good use.

NEW BLOCKING.—Workmen have been busy the past 10 days laying the tunnel of the Baker mine with new blocking and railroad iron. The iron used in the Franklin mine tunnel has been taken out and placed in the lower end of the Baker mine, for a distance of 1,700 ft. This work of the Baker mine is a fine piece of work, and the tunnel is over half a mile in length, and the cost of blocking must be quite heavy. It is proposed to leave the ironed portion of the flume remain through the season before it is taken out for a clean-up. Trouble has been experienced in washing through the tunnel heretofore, on account of a lack of sufficient grade—the fault of the company, who first cut it. But now it is expected less drawbacks will be met, since the tunnel supply of ironed. Several new powder drills are now being run in the Baker, preparatory to tearing up the banks generally.

CEMENT.—Mr. F. M. Chaboudon, Superintendent of the New Gold Run mine, informs us that the cement mill, erected in that mine last fall, is grinding up cement pretty rapidly. A drift has been run into the cement

bank upon the bedrock a distance of about 100 ft., and has been branched out with a full breast of over 90 ft. The gravel in that whole section is spotted—in some places very rich. It has been some time since hydraulic washing was resumed this season, and the cement mill and hydraulic washing are pushed with vigor. All indications point to a good season's work.

GOOD.—Placer Herald, Mar. 5: The good prospect found in the Herold Webster mine has increased as far as the lode has been uncovered, and that is about 125 ft. The owners are now running a tunnel to tap the lode about 75 ft. below the present surface of the lode. This lode was prospected over 20 years ago, and was then known as the "old man Mason's lode." It was abandoned, and for several years deemed unworthy of notice. About 10 years ago a San Francisco company did some work upon the claim, but owing to the inexperience and utter ignorance of that kind of mining of those having charge of the work, they failed to find the lode, and the ground was again abandoned. It has been since several times since, but no work done until located by the present owners, D. W. Malby and P. W. McCarthy, who went to work early this winter and stripped the lode for over 100 ft. on the surface, and are now opening it in good shape. They found the true lode within 30 ft. of the old works. Now near a miner might come to a fortune and mine it. This mine is located on the trail leading from Michigan Bluff to the W. mine, at Turkey Hill, and about 15 miles from Michigan Bluff.

**PLUMAS.**  
SAVERCOOL.—Greenville Bulletin, Mar. 2: Twenty stamps, or half the mill, are all that are running now, as the weather is so cold, and the ore to the mill during the terrible stormy weather. It has been since the whole 40 stamps will soon be in active operation.

SOUTHERN SKEEN COX.—The pay chimney has just been reached in the new or middle tunnel, and the quality of ore developed is very superior. A large lode of good ore is now being developed in the southeast drift from the main working tunnel. The new mill will be started this spring, and the general outlook of this mine is quite promising.

CHICKOKE.—The mill is doing continuous work. The shaft goes down steadily, being now a little over 100 ft. in depth. A timber shed has been erected adjoining the hoisting works, affording ample room for framing timbers under cover.

PLUMAS NATIONAL.—Mr. C. H. Aaron is making a complete test of the sulphurates at this mine, which thus far has proved to be quite satisfactory. It requires considerable experimenting to get the right heat, as well as the correct proportion of chemicals to be used, and consequently will take a little time to get everything arranged in perfect working order. The visit of Mr. Carter has greatly improved the working of the Frac concentrators.

CROWN MOUNTAIN.—Both mills have been running continuously during the last 18 days of February, with the exception of time lost in cleaning up. The results are proportionately better than ever before. The additional plates placed in the mill a short time since have done some satisfactory work that still another addition has been thought advisable, and the plates are now ready to be placed. In the mine, the contract on the 5th level has been completed, and a raise will shortly be started to open up the main body of pay, connecting with the works in the old incline in No. 4.

DISCOVERY OF COAL.—J. L. Davis, of Bidwell's Bridge, Big Meadows valley, Feb. 26: A discovery of coal was made by the discovery by him of what appears to be a vein of coal. It is estimated in the cut through which the water flows for draining the meadows, about a quarter of a mile beyond Bidwell's Bridge, on the road to Prattville. From his description, we judge it to be the kind known as brown coal, or lignite, as it shows marks of the wood or grass roots in its texture or formation. Mr. Davis is located his claim, and proposes to commence work at once, and ascertain what he has.

**SIERRA.**  
SIERRA CITY.—Mountain Messenger, Mar. 9: Pipe lay was struck in the Blue Gravel tunnel, above Sierra City. The discovery was made by Fine blue quartz gravel is near three-quarters up the face of the tunnel, which is prospecting favorably with gold. Length of tunnel, 300 ft., through mostly cement gravel. Ground rather dry and somewhat difficult to work, requiring occasional blasts of Giant powder.

**TUOLUMNE.**  
POCKET CLAIM.—The Edith pocket claim, about 2 miles northeast of Golden City, and owned by John E. Carne, prospects well in free gold; pieces to the value of 75 cents and \$1 to the pan. Three men are at work building dams, preparatory to sluicing off the gulch to follow up the pocket.

ED. T. FRANK, Superintendent of the Soulsbyville reduction works, has gone to the new gold fields in Alaska.

MR. W. C. HOLMES, of Brown's flat, is reported to have taken up a pocket some time last week.

## NEVADA.

**WASHOE DISTRICT.**  
BULLION.—Virginia City Enterprise, Mar. 8: Crosscut No. 1, 2,450 level, 100 ft. south of the shaft, is in 15 ft., and has its face in quartz giving low assays. The crosscut struck on the surface on this level is 8 ft. and has in its face stringers of quartz and porphyry, and is not yet through the west wall of the vein. The north drill hole on this level has been run a distance of 150 ft. and stopped in quartz.

BELCHER.—The southwest drift has been run and timbered 33 ft. during the week. Have commenced clearing out a west drift on the 400 level. The work of putting the traps on the surface has been completed at 1 o'clock Tuesday. Repairing the 300 and 1000 bob station will be completed in a few days. The pumps are running well and keeping the water below the 2100 level, as usual.

CALDONIA.—The pumps have been run an average of 18 hours per day, burning an average of 7 cords of wood per day. At the Foran shaft the station for the 1700 pump is completed, and the bearers for the pump are in place. We will commence putting the pump in place this evening. The Suto tunnel drift has been extended 33 ft.; total length, 116 ft.

OVERMAN.—The station for the 1700 pump has been completed, and the bearers for the pump are in place. We will commence putting the pump in place this evening, and will complete the balance-bob station to-day.

C. N. S. SHAFT.—Putting in the pumps at the 2400 level, and raising water to the 2100 level, the 3 room partitions, as the Hale & Norcross yesterday broke a rocking shaft of one of its bobs, and was compelled to stop pumping.

G. & C. AND B. & B. SHAFT.—Working on bob-bits Nos. 1, 4 and 5. No. 5 will be completed this week. Everything below the Suto tunnel level is ready for starting up level dry, and keeping it dry.

YELLOW JACKET.—We have extended the Suto tunnel level 54 ft. during the past week, making the present length of the same 554 ft. from the switch, or 627 ft. from a point 80 ft. east of the shaft. The drift is now in the Challenge company's ground.

SILVER HILL.—Work on our 900 level bulkhead is progressing favorably, and will finish up without a doubt, be solid and tight. No other work can be done in the mine until that is completed. The pump is handling the water easily and at reduced expense.

ALTA.—The shaft has been sunk and timbered 25 ft.; total depth, 1,800 ft.

UNION CON.—On the 2500 level the joint Mexican east crosscut has been extended 25 ft. Cutting out chamber for water in joint Sierra Nevada east crosscut.

MEXICAN.—On the 2500 level the joint Union Con. east crosscut has been extended 25 ft.

ONIR.—On the 2500 level the joint California east crosscut has been extended 36 ft. Cutting out station at 2700 level at bottom of joint Mexican vein.

C. & C. SHAFT.—At the C. & C. joint shaft are cutting

out a bob station at the 2100 level. The shaft has been sunk 8 ft.; total depth below the 2500 level, 13 ft.

HALL & NORCROSS.—The pumps were started up yesterday. All the machinery is working well.

CALDONIA.—During the past week 63 tons of ore, assaying \$53.23, have been extracted. The joint Ophir east crosscut, 2500 level, has been extended 36 ft.; the joint Con. Virginia west drift to the C. & C. shaft has been advanced 33 ft.

SIERRA NEVADA.—During the week 215 tons of ore were extracted. A shipment of bullion amounting to \$40,355.53 was made.

CUN. VIRGINIA.—During the past week 63 tons of ore, assaying \$47.65, have been extracted. On the 2500 level the joint Best & Bolcher raise has been extended 12 ft., and west crosscut No. 1 extended 17 ft. On the 2500 level the joint California west crosscut has been advanced 33 ft., and the south drift 20 ft. During the week \$5,413.15 in bullion was shipped.

SOUTH LATERAL.—The ground passed through last week was mostly decomposed andesite, with frequent clay seams. It was heavy ground, and requires to be cased and additional timbers set in. The repairmen working near the carriage stand have timbered 52 ft. of ground, and a portion of the repairmen have been engaged doubling up timbers near the face and repairing the track. The header is now 400 ft. in Imperial ground, and 10 ft. from the Jacks shaft. Total distance of south drift from the Julia connection, 3,749 ft. Flow of water from the mouth of the tunnel in standard gallons, 3,350,000.

**BRADSHAW DISTRICT.**

MONITOR ORE.—Silver State, Mar. 2: James H. Sackett, District Recorder at Silver Lake, took about 10 miles northwest from Winnemucca, called yesterday and showed us several very fine specimens of galena ore from the Monitor ledge. This is considered the best claim in the district, although there are others which may prove as good, or even better, when the same amount of work has been done on them. The Monitor is being prospected by a shaft, which is now down about 40 ft. At the bottom of the shaft, the ledge is 3 1/2 ft. wide, and carries about 18 inches of the ore above mentioned. A number of working tests made of this ore, in large and small quantities, show it to be worth from \$47 to \$220 per ton in silver, an average of about \$5.50 in gold, and about 15% lead. The district is adjoining the old Silver State district on the south, and is tolerably well supplied with wood and water.

**CANDELARIA DISTRICT.**

AT WORK.—True Future, Feb. 26: There is quite a number of men, scattered over the hills in this district, who are doing a little work on their locations. Some are going down with shafts on small stringers of ore, and others are doing more pretentious work, and are sinking with the intention of cutting the State, which a little capital would in a short time convert into a bullion-producing properties. As our mines go down, the ore increases in quantity and richness, and the veins everywhere are true fissures. We think that our district has passed its stagnant period. In a month or so every idle man in our town, who wants work, will be employed.

**CHERRY CREEK DISTRICT.**

OUTLOOK.—News, Mar. 2: The outlook for the future of Cherry Creek is brighter to-day than at any time since the district was discovered. When spring fairly opens, and work in the various mines of the district resumed, we shall hear but little of our miners going off to Arizona, New Mexico, and other remote sections in search of what we have at home. Old miners in this district well know that there are not, within a radius of 3 miles, in the mineral belt back of Cherry Creek, 6 or 8 as good mines as can be found anywhere in the State, which a little capital would in a short time convert into a bullion-producing properties. As our mines go down, the ore increases in quantity and richness, and the veins everywhere are true fissures. We think that our district has passed its stagnant period. In a month or so every idle man in our town, who wants work, will be employed.

**REBEL CREEK DISTRICT.**

TO BE WORKED.—Silver State, Mar. 1: From Charles Bernard we learn that work will soon be commenced on several mining claims in Rebel Creek district, one of his own among the number. There are some good mines in that district, and with a reasonable amount of prospecting, some good developments may be looked for during the coming summer.

**WARD DISTRICT.**

ORE.—Reflex, Feb. 26: A small body of ore was struck in the 3220-ft. crosscut, in the Martin White tunnel, Thursday night. Mr. Settepaup is of the opinion that the ore found in the footwall, which is going ahead in the 2000-ft. crosscut, from which a drift is being run to the 3220-ft. crosscut.

## ARIZONA.

MULE MOUNTAINS.—Tombstone Nugget, Mar. 6: Every day we receive encouraging news from the Mule mountains. All mining operations in the district have been successful, and even prospectors are eagerly sought for. Although the result of developments in the district already exceeded the expectations of the most sanguine, there is now a sale on the tapis that, if it comes off, will do much towards boosting up the camp and making it as prominent for the production of silver as it now is for the production of copper. We refer to the purchase now being negotiated for Silver Lake, the mine at the Elk, Minnie and Daisy. All these mines are on the southwest slope of the Mule mountains, running with each other, except the Oak Grove, which is an extension of the Mountain King. They crop out boldly, and assays from the croppings are very satisfactory, going from \$35 to \$164 per ton. But little work has been done on any of the mines, 20 ft. being the greatest depth attained; yet we are pleased to know that the work done has encouraged the proprietors. Mr. James Gray, formerly of Phoenix, is the principal owner.

## IDAHO.

BASE OF MOUNT ESTES.—Yankee Fork Herald, Feb. 26: There are several parties prospecting and doing assessment work around the base of Mount Estes. Harry Merritt and Charlie Lambert are running a tunnel to the Michigan ledge, situated near the forks of Jordan. They are in 75 ft. and have crossed several streaks of quartz, one of which is 3 ft. in width and contains considerable ore that carries more or less sulphurates of silver and some gold. The main ledge, which is 10 or 12 ft. in width, will be reached in a farther distance of about 10 ft. Lanyon & Moore are sinking on the Butcher Boy and down about 70 ft. in a ledge of medium quartz, carrying both silver and gold. Alec Robinson and Lee Dorsey are sinking on the Golden Gate. Cal. Clawson is running a single-banded tunnel to the slide under the Montana, in search of rich float, diamonds and precious stones and metals generally. Allison & Jamison are running a bedrock drain in right bank fork of Jordan with a view of thoroughly prospecting the gulch. The snow up Jordan is 4 ft. deep. The journeying to and from Mount Estes is made on snowshoes, and the road up Jordan is a hard one to travel.

CUSTER.—The owners of the Lemhi mine are pushing their tunnel ahead with all speed, and have only about 100 ft. more to run before striking the ledge. The tunnel will tap the ledge about 130 ft. below the surface. The country rock through which the tunnel runs is similar in every respect to that encountered in running for the Charles Dickens ledge, about half a mile southwest of Lemhi. It is the theory of the old timers that the rich belt of mineral in which Charles Dickens, Gen. Custer and Unknown mines are located, has been cut by the Yankee Fork river, and that subsequent developments will prove this theory correct, the Lemhi being the last location between the river and the northeastern extension of the belt in which the Dickens is located. Work on the same mine undoubtedly demonstrate the correctness or falsity of the opinions now entertained by the old timers that the Yankee Fork has cut in twain this mineral belt, and that the Custer and Unknown mines, together with a large number of mines on the northeast side of the Yankee Fork, and the Charles Dickens, the Lemhi and other prominent mines on the opposite side of the river, are on the same mineral belt. There is a move on foot by the miners and others in the employ of the Custer Co. to create a hospital fund

by each member contributing from \$1.50 to \$2 per month. Private letters are received by parties here from many sections about Yankee Fork the coming season and Wm. Wakefield, an old pioneer of California, and a close observer of matters that tend to make up a lively mining camp, gives it as his candid opinion, and so advises his friends, that he knows of no camp on the coast that presents a better opportunity of making money than right here in the Yankee Fork. Owing to the extreme winter he thinks that the 1st of May is early enough to start for this country, and so advises his many correspondents.

## MONTANA.

CATACT MINES.—Herald Independent, Feb. 26: Anderson & McKilligan's new "pony" quartz mill has started up. The extreme cold weather has not prevented them from pushing forward their enterprise, and a concentrator only remains to be added to complete the mill ready for work. This is in most respects a new enterprise, as only one stamp is employed, and it is driven by steam which is applied directly to the upper end of the stamp stem, giving it a rapidly reciprocating vertical movement of several hundred strokes per minute. The proprietors claim that they can reduce 10 tons of ore per day, and if such facts are verified by actual tests here, I have no doubt it will work a great change in quartz mill building. I am informed by Major Thornton that the Boulder M. Co. will proceed immediately to sinking a shaft 300 ft. deep. A considerable amount of work has been done during the winter on various locations in this vicinity with encouraging results, and as soon as the snow takes its departure our camp will spring up with renewed energy and life.

THE ALTA MONTANA CO.—The ore product of this company for the first 10 days of January amounted to 150 tons, as last reported by us. From the 11th to the 31st, 30 days inclusive, the product sent to the mill from the Alta, amounted to 311 tons of the first class ore, the average value of which was 1204 ounces silver per ton. The lowest assay was of a 15 ton lot carrying 50 ounces silver and 44% lead a ton; and the highest, a 40 ton lot which had 104 ounces silver and 00% lead to the ton. Despite the severity of the winter this company has made and is making real progress.

IRON ORE, from the new discovery near the works, to the amount of 6 tons, is daily delivered at the smelter. Thus far the vein seems to be six ft. wide and is entirely free from sulphur.

THE Lexington, of Butte, is increasing in value rapidly. In making exploration where some stringers of ore led off from the main chute toward where the footwall was supposed to be, he found an entirely new pay chute 7 ft. wide, which added to the 10 ft. along the hanging wall aggregates 16 ft. of pay—solid and rich. The new strike is 110 ft. below the surface and is opened for about 100 ft. along the vein. A shaft on this mine, now 140 ft. deep, will be continued to a depth of 500 ft. One crosscut will be made when 300 ft. down and another at the bottom, and afterwards levels run at every 100 ft. Then will follow a chloridizing mill in which to treat the base ore, while the old one continues to work on the free. Judge Davis expects to have run through his mill before July of this year, over 20,000 tons of ore from the Lexington since he began to work it 4 years ago.

THE GREGORY.—This mine is located in Jefferson county, about 2 1/2 miles from the works of the Alta Montana, and is one of the oldest worked in this region. Formerly there were two companies on this property, each owning 800 ft., but late in the autumn of last year they were united under one management, and extensive reduction works were soon set in operation on the rapidly accumulating ore product. The ore, which is abundant everywhere in the mine, carries from 75 to 100 ounces of silver, 45% to 80% lead and from 1/2 an ounce to 2 ounces per ton in gold, the gold being associated with the iron pyrites and the silver with the galena. A wet concentrator will be employed on the large dump which has been accumulating at the Con. Gregory for many years, and estimated at nearly 5,000 tons of ore.

PHILLIPSBURG.—Cor. News Northwest, Feb. 25: The Granite Mountain mine, recently sold for \$40,000, continues to develop finely. The upper tunnel is in 168 ft. on the lead, which runs west to east. Below a shaft is sunk 85 ft. on the face of the lead, which dips south at an angle of 35°, and only 22 ft. more are required to tap the lower tunnel, now in 205 ft. It is not improbable that by next fall 400 tons will be crushing ore from this ledge. The 600 ft. tunnel run to the Cable mine was tapped by the shaft at the steam hoisting works last week, and soon the 20-stamp Nolan mill, so long idle, will be dropping on ore from this famous mine. It might be well to say here that quite a number of miners have arrived in Phillipsburg lately, and that the labor market is well stocked. But the prospects for the coming season are good.

LEXINGTON.—Butte Miner, Mar. 1: The mining sensation, most freely the theme of conversation and discussion for several days past, is Davis' Lexington mine. The Lexington has always been rated a big mine. From its opening it has paid largely, and its pay chute has been drifted and worked for over 1,000 ft. without a barren spot being met with on the vein. The ore is taken from the workings in the east level, distant from the shaft nearly a mile. The rich ore vein, as far as exposed, has the appearance of being a new zone, and it is fully 5 ft. wide, without any indications of pinching. Silver in its purity is plainly discernible in much of the ore hoisted out daily. The daily output is about 17 tons.

ALICE.—Everything is running nicely at the Alice. No new developments are reported, but all the ore faces and bodies of ore present their customary fine appearance. About 10 tons of ore of good quality are hoisted daily. At the 700 level of the Alice a larger volume of water was temporarily encountered lately, but it abated without calling into requisition the full capacity of the pump, and it is now under easy control.

BELL.—The Bell is showing well in all its workings. The drifts continue to develop rich ore, and the supply of exhaustible supply of ore is already developing in the Bell and ore extraction is daily added to as the drifts run upon and open this remarkable vein.

BELLE OF BUTTE.—Messrs. Roubush & Young are engaged opening and working the Belle of Butte lode, which is situated immediately south of east of the Alice. A main shaft is down to a depth of about 85 ft. on the vein. At this depth levels are being run east and west on a good sized vein of paying ore. The ore is coming out assays from 60 to 80 ounces per ton in silver.

NOTES.—The Diamond is idle, but the dump pile at this mine is being cleaned and baled to the Dexter mill for crushing. The Colusa is in full blast with an ore product that must average nearly 50 tons per day. The Gargon yields its daily output of rich ore without material variation.

## OREGON.

CLEAN UPS.—Sentinel, Feb. 20: Lackland, of the Star Gulch hydraulic mines, made a good clean-up yesterday, but we have not been able to learn the amount taken out yet. Byboe & Hawket cleaned up after a run of 9 days in their Waldo mine, realizing \$1,600. It is expected that their water will last 3 months yet.

The Starling pipes are playing on very rich ground, and we are informed by a gentleman, who visited the mine lately, that the bedrock is literally yellow with gold.

## UTAH.

THE HICKORY.—Times, Feb. 26: A 6-ft. body of high-grade ore is now exposed, and an improvement is noticeable as depth is attained.

HORN SILVER.—This week's bullion shipment foots up 10 carloads. Mr. Byram is continuing his experiments at the smelter, and apparently with favorable results. The company have, during the week, purchased undeveloped property near the mine.

THE SPOON.—A fine body of ore was struck in this mine on Monday last. The Spoon lies not far from the Horn mine, and is supposed to be on the same ledge. The strike was made at the bottom of the 00-ft. shaft, and the owners, Messrs. Campbell, Burke & Lane, B. B. Brown, now have 10 tons of ore on the dump, which carries an average of 50 ounces silver and 40% lead. The ledge matter, 21 ft. in width, lies between walls of lime and porphyry.



## Mining Litigation.

¶ R. J. Kohler has entered suit in the Superior Court against Robert Watson and Samuel Corwin to recover \$10,000 damages for breach of contract.

Plaintiff and defendants entered into an agreement, whereby defendant Watson was to pay to plaintiff the sum of \$5,000, and defendant Corwin, \$2,500, and the three were to run the Kohler Reduction Works at Melrose, Alameda county. The defendants, after signing the contract, refused to pay the sums as above, and plaintiff prays damages.

Augustus J. Bowie, Jr., has brought suit against Archibald Borland for an accounting of alleged copartnership in the Gopher Con. Mining Co., and for a dissolution of the partnership. The complaint sets forth that in the spring of 1879 plaintiff became acquainted with the Gopher and Golden Terry mines, situated at Bobtail gulch, Lawrence county, D. T. He then entered into a partnership with defendant in a speculation to buy the mines and organize the Gopher Con. Defendant was to advance the necessary money for the purchase of the above mines, and plaintiff was to negotiate the purchase and carry through certain litigation then pending, and to sell the capital stock. According to the complaint a partnership was formed on the 23d of April, 1879, and the next month the minns were purchased for \$117,000, toward which the defendant advanced \$40,000, and took the title in his name. In the course of the speculation 10,000 shares of the stock were transferred to George Purmort. By March, 1880, they had sold 34,870 shares of the stock for a net sum of \$99,700, which sum was applied in payment of the purchase money. In May, 1880, the defendant repudiated the partnership agreement and refused to recognize the plaintiff's rights themselves. Since that time defendant has sold all the balance of the stock, and converted the proceeds to his own use.

The Jupiter vs. Bodie Mining Co.'s case is on trial in the U. S. Circuit Court. The suit is one of the most important that has arisen from the clashing of titles in Mono county, Messrs. Ralston and Yerington, who control the Jupiter Co., are the real plaintiffs, with D. O. Mills as an interested but silent partner. Cause of action was furnished by the Bodie Co. extending its explorations into the property claimed by the Jupiter Co. This property of the Jupiter Co. includes four locations—the Savage, East Savage, Riordan and Daily claims—representing in the aggregate 1,500 ft. by 330 ft. The Bodie Co. has run several drifts into this property claimed by the Jupiter, and struck a valuable ledge at a depth not yet attained by the Jupiter Co.'s workings. It is alleged that much if not all of the ore extracted by the Bodie Co. is coming from the Jupiter ground, and damages to the amount of \$5,000 are therefore claimed. The damages, however, are the smallest consideration in the suit. The real object is to quiet the title of the Bodie Co. to all the ground owned by the Jupiter Co. and some more.

The Bodie Co. claims that it obtained a conveyance of this disputed ground from former locators, who called the claim the Lucky Jack. The Lucky Jack was located May 26, 1875, by T. J. Fouse and C. E. Lewis. In June, 1877, the Lucky Jack was relocated under the name of the Savage, by Davis, Ireton, Lee and Gibbons. On the 21st of July, 1879, the Bodie Mining Co. obtained a conveyance of the Lucky Jack claim, 1,500x600 ft., through the original locators. Acting under authority of its conveyance the Bodie Co. has since treated the Jupiter claim as its own. It has explored it underground and occupied it overground. To this connection the Jupiter Co. objects on the ground that the Lucky Jack claim was never properly located, and therefore could not have been conveyed by the original locators. The claim was invalid, the Jupiter Co. says, because the Lucky Jack claim was 1,500 ft. by 1,600 ft.; whereas, the law of the district provided that the width of the claim should have been only 100 ft. In the second place, because the claim was not staked off properly, only one stake having been driven to indicate the north boundary. In the third place, because Fouse and Lewis, the locators of the claim, voluntarily abandoned it. In the fourth place, because no assessment work was done on the claim for 17 months, beginning with April, 1877. The allegation that the claim was not properly staked off appears to be the most serious, and the efforts of counsel on both sides are directed to that point.

**TESTING DRAIN PIPES.**—A writer in the *Ironmonger*, from long practical experience in testing drain pipes, confidently recommends for that purpose what he terms a "smoke test," and which gives evidence as to leaks both to the sight and smell. The materials that he employs are soiled cotton waste and sulphur, the smoke from which, after ignition, is blown into the drain or pipes. If leakages exist in the latter inside of the house, the smoke and smell both issue forth and show that something is wrong, and generally tell also just where the fault or faults are. Sulphur, as well known, is one of the best of disinfectants, and a dose of the fumes from this to the drains, after disease has been in a house, would effect much good.

A SALT LAKE gentleman blew up one of the old smelting furnaces at Oreana recently, and got five or six thousand dollars' worth of bullion out of the ruins.

## Raisin Making in California.

In the report of the Viticultural Commission lately issued there is a brief review of raisin making in this State, by R. B. Blowers, Commissioner of the Sacramento district.

Raisins are made from the Muscatel Gordo Blanco and Muscat of Alexandria, preferably of the former, also a seedless raisin, highly esteemed, made from the seedless Sultan. The grape should be allowed to remain on the vine until quite ripe, showing a yellowish or golden color and being more translucent than when too green. Then they should be carefully picked and placed upon a drying tray (usually two by three feet in size), then exposed with an inclination toward the sun in some convenient place, generally between the rows in the vineyard or in some contiguous open land. After having been exposed a sufficient time to become about half dried, they are turned once in this manner, viz: two workmen taking an empty tray, place it upon a full one, holding them together firmly, and with a swinging motion turn them over and replace the now turned grapes in their former position. The turning should be done before the dew is quite off the grapes in early morning; then when the grapes have become so dry as to lose their ashy appearance, some being a little too green, and some quite dry enough, they are, after removing those entirely too green, elid from the tray into large sweat boxes, having a thick sheet of paper between about every 25 or 30 pounds of raisins, then are removed to the store-room, where they should remain two weeks or more. When ready to pack it will be found that the two moist ones have parted with their surplus moisture which has been absorbed by the stems and drier raisins. The stems are now tough and the raisins soft and ready to pack. They are carefully placed in packing frames made of iron or steel. The large and fair ones being placed carefully in the bottom of the frames, the surplus stems and imperfect berries cut away, then the average raisins are arranged in and weighed, placing five pounds in each frame, then pressed enough to make them firm in the frame, but not enough to break the skin. They are then passed to an inspector who examines the exposed side of the raisins, removing any imperfect ones, then placing the wrapper paper on the frame, holds it in place with a wooden or steel plate, turns it bottom up, drops the left end into the box, slides the plate quickly from under the frame and it drops into the box, then pressing slightly upon the moveable bottom of the frame, the frame is removed, the bottom of the frame is then pressed more firmly to cause the raisins to fill the space formerly occupied by the sides and ends of the frame; then it is removed and the face of the latter is exposed, all imperfect berries or too wet ones are removed and all vacancies or hollows filled by large, loose raisins. The label of the proprietor is then placed on the face; the ends of the wrapper, and then the sides are folded over, the box cover nailed on, and they are ready for market.

Many hundred tons of shipping grapes are sent East from this district to all principal markets in the United States. The Emperor, Tokay, Black Morocco and the Muscat family are most liked for the Eastern market.

Irrigation is a very important factor in the success of the fruit grower, but if the situation is good in other respects, and no ditch water can be secured, it is found that in many parts of the State an unfailing supply lies but a small way beneath the surface in gravel ridges. Former water courses having been filled with gravel, the surface stream diverted sometimes many miles away, leave quite a large flow of water in the gravel. This being tapped by a well the only equipment needed is a straw-burner engine and rotary pump, and 100 or more acres can be irrigated with economy, insuring a good profit and a pleasant home.

In an experiment made recently in Yolo county, after having submerged the entire vineyard for nearly two weeks, each a well being on the place, the ditch water was shut off from 20 acres of the vineyard, and while the water still covered the entire surface to the extent of over 19 acres, the pump was run five hours, supplying the seepage and raising the water five-eighths of an inch over the entire surface, showing that in 24 hours three inches in excess of the seepage could be added to 19 acres after the ground had been saturated.

Cost of planting and cultivating, irrigating, labor, subsistence, etc., including total expense for first year, is from \$20 to \$25 per acre, if thoroughly well done; second year, \$15 to \$20; third year, many varieties, if well cared for, yield a profit; if not well attended to it may take a year or two longer. Nothing pays better than care, and nothing loses more surely than negligence in vine growing. In pruning, the habit of each variety grown should be closely studied. In grafting, great care should be taken to choose stock with wood of similar growth; if the variety desired is a coarse wood and large grower, a similar stock should be selected; if wood is of fine texture and slow growth, a wood of fine texture should be selected as grafting stock.

GLASS manufacture is making rapid strides in Ohio. Last year there were five new works erected, and this year there will probably be as many more. There are 19 firms in the State engaged in the manufacture, which employ over 2,000 men.

## Geological Survey Work.

The U. S. Geological Survey, under Mr. Clarence King, is doing a good work in the collection of facts concerning the mining industry of the coast. They have taken three great central points—Leadville, Colorado, and the Comstock and Eureka districts, Nevada, and have worked them up thoroughly. At these places they will find a large mass of material ready to hand. The appliances of mining, methods of working the mines, metallurgical processes, etc., are all being worked up. The topography and geology of the sections receive special attention.

We had an opportunity this week of examining the very fine map of Eureka district, made by Frederick A. Clark, of the Survey, from data gathered by over a year's work of the party. The map itself is in great detail, and on a scale of six inches to the mile. The map is 9 7-10 ft. square, and represents an area 20 miles square, or 400 square miles. It includes the location of the Richmond and other celebrated mines, with the town of Eureka and its approaches and surroundings. The map is as correct as science can make it.

The contours are 50 ft.; that is, in surveying the country represented, its form for every 50 ft. of perpendicular height was ascertained. The lowest a titude measured was 6,150 ft., and the highest 10,637, making over 4,500 ft. in vertical height, which was divided into 90 horizontal planes 50 ft. thick. The outlines of the base of each of these planes is represented upon the map, thus showing the exact topography of the entire country, the canyons, hills, peaks, slopes and mountains. Every stream and spring, every road and tract, every mine of any importance is laid down. It took 16 months' work on this field to obtain data for the construction of the map. It took five men one month of constant work from 5 o'clock A. M. to 11 and 12 P. M. each day to make the drawing. The map is made on a scale of 1 to 10,000, or about six inches to the mile. It is for the Geological Survey, and upon it will be designated the geological formations found in that section of Nevada. The geological coloring will be done by another party, the data having all been collected.

This map will be lithographed in sections and published. Owing to the scale upon which it is made, the geology can be worked up very closely, for which reason, in fact, it was made so large. The map has been sent on to Washington.

## Silver Bell District, Arizona.

This new mining district located about 40 miles northwest of Tucson, near Red Rock station on the Southern Pacific railroad, is coming into great prominence for the extent and great richness of its mines.

The Old Boot, Blue Coat and Copper King mines have each been developed sufficiently to warrant the erection of a 30-ton smelter, and from the character of the ores, a repetition of the successes of Bisbee is anticipated. These three mines are the property of the Huachuca Mining Co., organized under the laws of the State of New York, Guy R. Pelton, as President, R. Danneheim as Secretary, and Z. Staab as Treasurer. Mr. W. B. Scott, Superintendent of the company's mines, has already started to San Francisco to purchase a smelter, which will be put in operation as soon as it is possible to erect it. The ore, a red oxide of copper, carrying considerable iron, is it thought will be easily smelted with the natural flux contained therein.

A new town has been started in the district called Pelton, and a store opened. The district, it is said, comprises an immense number of very rich ledges, all carrying more or less silver.—*Citizen*.

## San Pedro District, Arizona.

Mr. W. F. Peabody was in town to-day from the San Pedro mining district, which comprises a section of mineral country at the confluence of the San Pedro and Gila rivers, about 40 miles from Casa Grande. This district, from the exceeding richness of its mines, is destined to excite a great deal of attention. Mr. Peabody has some of the most beautiful specimens of ore we have ever seen, taken from the Walston mine, owned by himself and J. S. Walston. They are not only beautiful, but rich in silver almost beyond computation. Mr. Peabody has just shipped to San Francisco, for a working test, about 800 lbs. of ore taken from a depth of 50 ft. which assays an average of \$1,500 per ton. An 18-inch streak of this mineral occurs in an eight-foot ledge of quartz that assays over \$50 per ton. Messrs. Peabody & Walston have a veritable bonanza in their mine, and fully deserve their good fortune for their perseverance and industry.—*Citizen*.

**THE CHLORIDING BOOM.**—A number of miners formerly in the employ of the Stormont company are now chloriding in the different mines on the East and White reefs, all sanguine of making their \$4 per day. Six are at work on the Vanderbilt mine, and judging from the looks of the ore and the quantity they have extracted already, big wages will be their reward. Chloriders are also doing remarkably well on the Toquerville, Duffin and Spillsbury mines.—*Silver Reef Miner*.

## Stopping the Leadville Mines.

The mining interests of Colorado have ever had a good deal to contend with. They have had the obstacles of nature and the cussedness of mankind to fight. First there were serious disadvantages of situation to struggle against. A wide expanse of barren plain stretched away eastward from the mines, to retard the transportation of machinery and to discourage capital. The waters flowed into the deep shafts, to dampen enthusiasm and drown out energy and effort. The mine jumper came along to create a scene of insecurity, to interfere with work and to generally distract and hinder. The legal claimant appeared with his suits of ouster and his injunctions to weary and to worry. Then the designing demagogue came along to excite to strikes, to interfere with work and to stop the golden yield.

But over all these things the miners have, in a large measure, triumphed. The power of steam, with its smooth, iron roadway, and its fleet tireless messengers, has placed the mines adjacent to the smelter, the foundry and the money center. The same power, its swift energies directed in another way, has cleared the shafts of water. The mine jumper hangs harmless from the convenient branch of the adjacent tree. The litigant has, in a measure, been sat down upon by the courts and by public opinion.

The meddlesome demagogue has been suppressed by the strong hand of executive power. No sooner, however, have these triumphs been scored and the mining interests apparently secured a clear field for expansion and development, than a new and harassing enemy appears in the form of the authority of the law. The County Commissioners of Lake county have levied upon all the personal property of the Little Pittsburg, including machinery and cord wood, for the purpose of enforcing collection of the tax levied upon the net income. This, of course, has stopped all operations and thrown all the miners employed on the property—nearly 200 in number—out of work. The development of the rich ore body just discovered is indefinitely postponed. Similar proceedings are threatened against all the mines. The inevitable result of all this will be the indefinite suspension of mining operations, the enforced idleness of thousands of men, the stagnation of business in the second city of the State, serious damage to business generally, and disorder, violence and crime. An unemployed laboring population, agitated by the fears of want, inflamed by a sense of wrong, and, perchance, goaded by the torments of poverty, cannot be kept quiet and cannot long be restrained from excesses.

The action of the Lake county Commissioners is thus a mad, reckless blow, not only at the business interests of Leadville and of Colorado, but also at the peace, safety and lives of the people. It endangers everything. It has evidently been taken in the expectation of forcing the mining companies to terms, and, therefore, is only a piece of passionate, desperate intimidation and bluffing. Such a proceeding is as foolish as it is wicked. It is as unworthy of sensible officers of the law as it would be of christian, provident citizens. Laws are not enforced by such means. The Commissioners cannot expect to collect the tax through their levy. The assessment against the Little Pittsburg is over \$50,000, and the Commissioners have seized nothing that they can sell for any such amount; therefore they can expect nothing but to force the company to terms.

There is a serious question as to how the tax justly levied upon the net product of the mines, owned in part by foreign stockholders, is to be collected. A test case to settle this question could have been raised by levying on a portion of the company's property, and without this sweeping seizure that disarranges business, disturbs the peace of the community and endangers life. The question must ultimately be settled by such a test case, so the present violent proceeding will have no effect except to do the great injury and harm to the people already indicated. Nothing but evil will result.

It seems a little hard that the mining interests of Leadville, after having overcome the disadvantages of situation, after having fought down the jumper and the striker, and after having suppressed the litigant, should now have the authorities to overcome. Only interests of wonderful power, resource and vitality could have prevailed over so much; and they will doubtless be able to triumph over the new enemy.

Lake county, ever since it has come into prominence through the marvelous carbonates discoveries, seems to have been blessed with a set of County Commissioners whose sole object in life has been to see how much injury they could inflict upon the people and how much general wickedness they could perpetrate. It is to be hoped that their last performance will prove to be the sublime atrocity, the final exasperation that will arouse a popular resentment, which will bring them to their senses or suppress them altogether.—*Denver Republican*.

A LETTER from Tombstone, Arizona, says: There are 60 saloons here, and 10 faro games, besides chuck-a-luck, percentage poker and the like. The gambling houses are crowded from morning to night.

EIGHTY miles south of Winnemucca, Nev., in what is known as Bolivia district, copper and iron ores abound, but they are worthless now, and will remain so until a railroad is built through that section.



## Forests or Floods.

The yearly destruction of forests by legitimate enterprise will in a short time leave us without any woods. But the waste of careless lumbermen, tannin seekers and the fire fiend must bring us almost immediately to the condition of degenerate Turkey, Persia and Spain. Forests in the southern part of the State are already much less than the prescribed fifth of the territory, and we cannot afford to lose another bush. Fire is responsible for more floods than anything, except water. When a forest is burned, not only the trees, and shrubs, and bushes, which would escape the lumbermen, but the moss and grass are also destroyed. These and the roots hold the soil on the mountains and steep places, and it is this top spongy soil together with the leaves of trees, mold and brush which hold the rain or retard its progress to the earth. So a mountain or ravine covered with woods with a given rainfall, will supply the springs which drain it during the entire year. Denude this locality of its timber and there will be an excess of water at one season, and none at all at another. In the first case, the rain must come to the earth slowly; and once there it finds a loose mold to absorb it, leaves, and roots, and brush to obstruct it; so that it has time to find its way into the veins and fissures which make the springs. In the other case the rain comes down directly on the soil; that part which is soft and might absorb the water is washed away, and the hard surface of the mountain turns the whole rain into turbulent torrents to the lowlands, and in the summer there are no springs and no brooks. Thus, the destruction of forests by leaving nothing to give moisture to the air when there is no rain, gives us not only seasons of flood and drouth, but also greater extremes of temperature, for moisture is the great equalizer of temperature, as those know who may have lived upon islands.

The misuse of fire is the curse of California. At the end of the dry season, when everything is like tinder, the California farmer will find something to burn; rubbish, straw, stubble, or, worst of all, he will undertake to clear some land by setting fire to it. From August to November there is probably not a day but what a fire runs away from its originator in some part of the State and does more or less damage. What shall we do to stop it? We can gather some information from other countries. All through Europe there are officers whose only duty it is to watch and preserve the forests. In many of the principal civilized States there exist regular schools of forestry in which young men are educated in everything pertaining to trees; such subjects, for instance, as the rainfall as affected by trees, preservation of mountain sides, prevention of too rapid draining of water by plantation where the water sheds are very steep, etc.

One of the axioms laid down is that one-fifth part of any territory 100 miles square should be in forest, if that territory is to produce the maximum returns of which it is capable. That amount of forest has been demonstrated over and over again to be the least which a territory should have. Forests prevent drouths and extremes of temperature. France, Germany and Austria maintain this proportion, as do other countries. In Germany the system is followed of utilizing the woods directly by cutting one-third of the State forests every year so that in 30 years the whole forest is cut down, but is still always growing and always a forest.

Another axiom is that all mountain slopes having an angle of 45 degrees, or greater, when not covered with grass should be covered with trees. In Switzerland, since the government has adopted this principle, and planted trees in exposed localities, and prevented the clearing of other such situations, land slides and floods have become much less common than formerly. In France, by the intelligent plantation of trees they have reclaimed extensive tracts of desert and partially arid tracts. The most notable instance is the reclamation of the "Landes" (formerly a sandy desert to the south of Bordeaux) by gradually setting out pines in it, which, very much to the surprise of most people, have taken root and grown until now the entire section is inhabited, cultivated or in forest. This forest brings in a good revenue to the government, and the taxes the inhabitants now pay make the investment a good one.

In France the government is now giving a great deal of attention to tracts of private mountain lands which have been denuded of trees and turned, as far as they were capable of it, into sheep pastures. Extensive floods, some of them very disastrous, have taken place since this change, and the government has now set to work to replant these tracts with a view to so hold the rainfall as to diminish the floods prevalent under the present conditions. Some of the nurseries established to carry out the plan are to furnish 300,000 trees each year. How much easier to have kept the old woods!

"HONEST JOURNALISM."—President Hayes recently made a speech in Baltimore in which he complimented "honest journalism." If the management of all newspapers were "honest," the country would be far better off than it is at present, for then newspaper would condemn all dishonesty; but, unfortunately, too many newspapers are now used to help plunder the people. They advocate the election of dishonest candidates to office for the purpose of making money for their masters through corrupt practices.—*Morning Call.*

## USEFUL INFORMATION.

**IMPROVEMENTS IN DYEING.**—Mr. Theodore Daux is the inventor of a process for fixing rapidly and uniformly mordants on cachemeres, merinos and such kinds of woolen goods, as also for the chemical curing of wool. The goods are treated in this ordinary way until they are ready for the mordants. These are prepared cold, and are composed according to the color required, acidulated or not, or even consisting of one acid only, according to the new chemicals to be employed. The goods are immersed and worked till well impregnated, when they are lifted out and pressed, and afterwards passed on cylinders heated by steam to a high degree, in order to fix the mordant in a rapid and uniform manner. The fabrics thus mordanted are taken at once into the dye-bath at the boil, and the rest of the dyeing and finishing done in the usual way. Heated stoves can be used instead of cylinders. Mr. Daulol Faquet fixes colors by steam. He replaces the dye-baths which, as is not the rule, are generally heated up to a certain temperature in order to fix the color on the fiber, by completely cold baths, and afterwards steams to fix the color. It is said that great economy is effected by this method.

**FOR CLEANING KID GLOVES.**—Get one quart of deodorized benzine, one drachm of sulphuric ether, one drachm of chloroform, two drachms of alcohol. Pour a little of this into a clean bowl, and wash the gloves in it as you would wash anything. After the dirt is nearly out, rinse in more of the clean fluid. Usually one rinsing is enough, but if the gloves were very much soiled, rinse the second time. If the gloves are of cheap kid, it is best to dry them on the hand, but a nice glove, after having been rubbed with a soft cloth to smooth out wrinkles, may be hung on a line to dry. This preparation is an excellent thing to keep in the house, not only for cleaning gloves, but for taking out grease spots from clothing and carpets, and for sponging coat collars and felt hats.

A GOOD CROCK OIL is made as follows: Take olive oil and dissolve it in boiling alcohol, and add it drop by drop until it is no longer taken into solution. Upon cooling it will let fall crystals, and leave a considerable portion still fluid. The fluid part is to be poured off, filtered through a piece of white blotting-paper, and may be used in this form, or the alcohol may be distilled off for fresh processes, and the pure lubricating oil which remains is very suitable for oiling watches, clocks, or other delicate machinery. This will not oxidize or gum up, even when exposed to great cold. Or take neatfoot oil and drop into it some lead shavings in order to neutralize the acid contained in the oil. Let this stand for a considerable time (the longer the better). Oil thus prepared never corrodes or thickens.

**PURIFYING A WELL.**—A correspondent of the *Inter-Ocean*, living in Battle Creek, Mich., says that he purified his well of water, which was so subject to many worms, bugs and other insects as to render it almost unfit for drinking, by placing in the well a couple of good-sized trout. They have kept perfectly healthy, and have eaten up every live thing in the water; in the winter season crumbs of bread or cracker are thrown in. The water is perfectly pure and sweet.

**TO MEND BROKEN CROCKERY,** use lime and the white of an egg. Mix only enough to mend one article at a time, as it soon hardens and cannot be used. Powder a small quantity of the lime, and mix to a paste with the egg. Apply quickly to the edges, and place firmly together. It will soon become set and strong, seldom breaking in the same place.

**PRESERVING LEATHER.**—To preserve leather hose, belting, etc., in good condition, use crude castor-oil, warmed, if possible, and freely applied. It increases the pliability of the leather and the cling of the belts, and does not become rancid. Rats avoid it. In hose it should be pumped in from the interior under considerable pressure, thus thoroughly filling the pores.

**KEROSENE** will soften boots or shoes which have been hardened by water, and render them as pliable as when new. It will also make tin kettles as bright as when new. Saturate a woolen rag and rub with it. Stains may also be removed from clean varnished furniture with kerosene.

**SOREL'S CEMENT.**—Mix commercial zinc white with one-half its bulk of fine sand, adding a solution of chloride of zinc of 1.26 specific gravity, and rub the whole thoroughly together in a mortar. The mixture must be applied at once, as it hardens very quickly.

**BEESEWAX AND SALT** will make flat-irons as clean and as smooth as glass. Tie a lump of wax in a rag, and keep it for that purpose; when the irons are hot rub them with the wax rag, then scour with a clean paper or cloth sprinkled with salt.

**ASBESTOS POWDER,** made into a thick paste with liquid silicate of soda, is used with great advantage for making joints, fitting taps and connecting pipes, filling cracks, etc. It hardens very quickly, endures any heat, and is steam tight.

**GLUCOSE SUGAR FROM RAGS.**—We last week alluded to the manufacture in Brooklyn, N. Y., of glucose from old leather shoes. We now add the following: "The manufacture of glucose from rags, the novel industry recently started in Germany, is regarded with much disfavor, and it is understood that the German government will be likely to interfere with the business. The glucose is said to be chemically identical with grape sugar. The process, which is represented to be very cheap, is as follows: Old linen rags, which are composed of hard vegetable fibers, are converted into dextrine by the application of sulphuric acid; and the product thus obtained is then washed with milk of lime. Next it is treated with a stronger solution of the sulphuric acid than that first used, when the material is immediately transformed and crystallized into a glucose, from which appetizing jellies and tempting confections can be made."

**A NOVEL MODE OF CROSSING STREAMS.**—The following is an extract from a survey report by Lieut. (now Major) Woodthorpe, R. E., written in 1876, describing the method which he saw practiced by men of the Naga tribes, for crossing a deep stream too rapid for their feeble powers of swimming, and about 20 yards wide: "Taking large stones in their hands, they waded in up to their necks, and throwing up their legs and lowering their hands, the stones carried them to the bottom, along which they crept on all fours till they reached the shallows on the other side." The rough bottom afforded them sufficient hold to withstand the modified current and resist flotation.

**MICA IN SHOE MAKING.**—This mineral, mica, is now applied to a new use, that of fashioning it into middle soles to boots and shoes. The invention consists of a sheet of mica, embedded in thin coatings of cement, and placed in the boot or shoe, under and adjacent to the insole, the upper leather of the shoe lapping over its edges, or next under the filling and the outer, or bottom sole, and covering the upper space from the toe to the instep.

**WITHERED LEAVES** having the yellow-brown or red autumnal colors can be made green again by steeping them in water with a little zinc powder.

## GOOD HEALTH.

## Cigarette Smoking—Its Increase and Danger.

The Americans may be said to have become a nation of cigarette smokers. Time was, not a very great number of years ago, when the consumption of "paper cigars" in the United States was confined almost entirely to the foreign-born portion of our population. To-day more natives than foreigners smoke them. The enormous growth of the industry is readily shown by a comparison of figures. For example, in the fiscal year 1870, tax was paid in the United States on 13,881,417 cigarettes, and in the fiscal year 1880 on 408,708,365—an increase in 10 years of 394,826,948 cigarettes. The following table shows the number on which tax was paid during each of the past 11 fiscal years:

Year.	No. Cigarettes
1870.....	13,881,417
1871.....	18,030,753
1872.....	20,691,059
1873.....	27,088,056
1874.....	28,718,200
1875.....	41,297,883
1876.....	77,420,586
1877.....	149,069,257
1878.....	165,139,594
1879.....	238,276,317
1880.....	408,708,365
Total.....	1,180,271,072

The United States now ranks as the heaviest cigarette producer in the world, France coming next. The annual sale of cigarettes in France is estimated at 900,000 lbs., or about 300,000,000 cigarettes—only about one-quarter of the number consumed in this country. There can be but little doubt that the majority of cigarettes are consumed by boys between the ages of 12 and 18 to 20. Men, as a rule, smoke cigars and pipes. That the inordinate use of tobacco at an early age is hurtful is uncontested. Recent scientific investigations go to prove that smoking, especially cigarette smoking, is very detrimental to youths during the transition period from boyhood to manhood. The stunted forms of many men is as much due to excessive use of tobacco at an early age as to anything else. What cigarette smoking and absinthe drinking combined can accomplish may readily be seen by a visit to any large French town.

**VENTILATE YOUR CLOSETS.**—Soiled undergarments or the wash clothes ought not to be put into a closet, ventilated or not ventilated. They should be placed in a large bag made for the purpose, or a roomy basket, and then put in a well-aired room at some distance from the family. Having thus excluded one of the fertile sources of bad odors in closets, the next point is to see that the closets are properly ventilated. It matters not how clean the clothing in the closets may be; if there is no ventilation that clothing will not be what it should be. Any garments after being absorbed for a while will absorb more or less of the exhalations which arise from the body, and thus contain an amount of foreign—it may be hurtful—matter which free circulation of pure air can soon remove.

**THE SCIENCE OF LIFE.**—How few of us acquire this science until we are old enough for life to have lost half its charms! The sciences of life consists in knowing how to take care of your health, how to make use of people, how to make the most of yourself and how to push your way in the world. These are the things which everybody ought to know and which very few people do know. How never to get sick, how to develop your health and strength to the utmost, how to make every man you meet your friend, how to attach a few people to you as your bosom friends to be relied on in every case, how to earn money and save it, how to behave just as you ought to behave amid all the contingencies and unforeseen happenings of life, how so to live down your past if it is of such a character as to demand being lived down, how to manage yourself as to escape the entanglements of bad women and insincere friends, how to provide yourself, if you wish to do so, with a wife that will not be a burden and shame to you all the rest of your life, how to approach old age gracefully, so that you will not be a grief and reproach to yourself or others, how to make use of past errors and crimes, so that they may prove a help rather than a hindrance to you in the future; all these and many other things are to be included in the science of living, and the pity is that we only appreciate that science at its true value when the bloom of life is gone.

**THE EFFECTS OF WORRY.**—That the effects of worry are more to be dreaded than those of simple hard work is evident from noting the classes of persons who suffer most from the effects of mental overstrain. The case-book of the physician shows that it is the speculator, the hating man, the railway manager, the great merchant, the superintendent of large manufacturing or commercial works, who most frequently exhibits the symptoms of cerebral exhaustion. Mental cares accompanied with suppressed emotion, occupations liable to great vicissitudes of fortune, and those which involve the hearing on the mind of a multiplicity of intricate details, eventually break down the lives of the strongest. In estimating what may be called the staying powers of different minds under hard work, it is always necessary to take early training into account. A young man cast suddenly into a position involving great care and responsibility, will break down in circumstances in which, had he been gradually habituated to the position, he would have performed its duties without difficulty. It is probably for this reason that the professional classes generally suffer less from the effects of overstrain than others. They have a long course of preliminary training, and their work comes on them by degrees; therefore, when it does come in excessive quantity, it finds them prepared for it. Those, on the other hand, who suddenly vaunt into a position requiring severe mental toil, generally die before their time.

**HOW TO PREVENT WRINKLES.**—There is no such thing as wiping out wrinkles. In men they are often honorable evidence of hard mental labor, in women they are usually the evidence of coming age, although care and suffering have much to do with them. Sometimes fair foreheads are prematurely wrinkled from a nervous habit of raising the eyebrows, and from a too great and a too constant pressure of the pillow on one or both sides of the head while sleeping. And just here comes a fact worth remembering. If the forehead has escaped wrinkles, crow's feet are prematurely seen about the corners of the eyes. We all see these crow's feet in men and women whose brows are smooth and young looking. They are the result of sleeping on the light and left sides. The pressure upon the temple and cheeks leaves wrinkles at the corners and underneath the eyes which disappear in a few hours, but finally becomes so fixed that neither hours nor ablutions will abate them. If girl children were compelled to sleep on their backs and continued the habit when they reach womanhood and afterward, they would arrive at middle life without crow's feet gathering in the neighborhood of the eyes, and in most cases their foreheads would be free from even shallow furrows.

**A NEW FLEA PEST.**—The Manchester (N. H.) *Mirror* gives the following: A Hollis family by the name of Patch is tormented with fleas to a degree heretofore unknown in a civilized country. It appears that in 1876 a member of the family came from a sea-port town in a second-hand suit of clothing. Shortly after, the father, mother and three members of the household discovered the presence of a black insect. This insect is called a flea by the Hollis people. He burrows under the skin of the victim and tortures him day and night. Artificial heat makes him more lively, and hence the family have little or no fire in house, preferring to endure the cold rather than a terrible burning and itching. They have haked their clothes and hurned their beds, they have consulted medical men at home and abroad, have tried internal and external remedies, and still get no relief. They are isolated from the community and in deep trouble.

**STAMMERING** is sometimes organic, caused by hare-lip, cleft palate, lengthened uvula, tumors, or something of the kind. Of course, when this is the case, the cause must be removed. Sometimes it is caused by general weakness, paralysis, rheumatic affection of the muscles of the face, etc., and sometimes it is acquired by habitually imitating a stammerer. Any specific or cure for stammering must be adapted to the special cause which produces the affliction.





W. B. EWER, SENIOR EDITOR.

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SAN FRANCISCO:

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## The Week.

Since our last issue the Legislature has completed its session and adjourned, leaving a great deal of business unsettled, owing to the long wrangle over the debris act.

The explosion of the powder works, which is referred to elsewhere, has attracted considerable attention among mining men, owing to the nature of the materials used to manufacture the explosive.

We describe in another column a very complete leaching apparatus and mill built in this city for Mexico, and while this is not the first California machinery shipped there, we expect hereafter considerable more will follow.

The wages question is still being agitated on the Comstock. At Silver Reef, Utah, the question has bred trouble. When the men refused to work for less than \$4, the Stormont shut down and the Barbee & Walker only ran its mill on ore already out. On the 27th ult., a meeting of the Miners' Union was called, and afterward the men, forming into line, marched down to the Buckeye mine and requested Supt. Allen, of the Stormont company, to leave the camp forthwith. Mr. Allen requested three hours' time, in order to arrange his business matters, but the men were peremptory, and told him that five minutes was the limit. Mr. Allen thereupon mounted his horse and left the camp, being accompanied as far as Bellevue by an escort of Miners' Union men. This action will leave the organization open to severe criticism. The Christy and Barbee & Walker mines will probably be shut down also, and the miners will do themselves no good by acting toward the Superintendent in this manner, since it is the companies, not the Superintendents, who take the action.

## California Mining Machinery for Mexico.

The New Mill, Furnace and Lixiviating Works for the Rosario Mining Co.

Prescott, Scott & Co. have just finished to order of Parke & Lacy, the most complete mill, with roasting furnaces and lixiviating works ever constructed on this coast. The plant is intended for the Rosario mines, Mexico. Two schooner loads of the material have already been shipped, but the engine and some other machinery is yet to be sent. The whole mill and reduction works, when ready to run, will have cost \$150,000. Every portion of the machinery combines all the latest improvements of every kind, no expense or pains having been spared in carrying out the plans.

The mines being about 100 miles from the sea coast, this machinery will have to be hauled over the road, which has been put in order for the purpose. The contractors here had made to order and shipped by the steamer *Neuborn*, ten 16-mule wagons, with harness and all necessary appliances for handling the machinery. The engine frame weighing 11,000 lbs., a special wagon was made for it, and special wagons with saddles were made to take the two steel boilers, which weigh 7,500 lbs. each. They ship from here to Guaymas, a port of entry, and there, without unloading, having no dutiable material aboard, the schooners sail down the coast, 150 miles to Ajavampo, where the freight is landed.

For the present, only 40 stamps will be used, but the mill is so arranged that it will eventually be made of 80-stamp capacity, the engine being of sufficient power and all the arrangements being made to that end.

The ore is delivered to the ore-house by a tramroad or wire tramway two miles long, running from the mine to the mill. The drying of the ore will be done in the Stetefeldt dry kiln, a device for which Mr. Stetefeldt lately obtained a patent through the MINING AND SCIENTIFIC PRESS Patent Agency. This drier consists of a series of inclined cast iron shelves, upon which the ore rests and slides down when the dry ore is removed from the lowest shelf. The fire enters the kiln or drying chamber under the top shelf, and works downward, an important feature in the saving of the iron. When the fire is applied first to the lowest plate, upon which is already heated ore, this plate becomes red hot and requires frequent renewal. When applied first to the upper plate, receiving fresh cold ore, this is not the case. As soon as the ore is dried it falls into care and is taken to the Eclipse feeders at the batteries. The batteries have double discharge mortars of an improved pattern, which are found, upon test, to be very effective in a dry-crushing mill. In order to take away all the dust, two large dust chambers are arranged above the batteries, provided with sheet-iron hoppers. These dust chambers are connected with a Sturtevant exhaust fan which draws the dust into them, where it is deposited at the bottom of the sheet-iron hopper, from whence it is discharged when it accumulates in sufficient quantity.

From the battery the pulp is taken by screw conveyors and an elevator, first, into a hopper provided with a sifter or revolving screen, where coarse particles are sifted out and returned to the battery. The hopper is provided with a Standish feeder by which the pulp is discharged into the conveyor and elevator, which takes it to the Stetefeldt furnace. This furnace is of the largest size, with a shaft 6 ft. square and 43 ft. high, and a system of 12 dust chambers. Mr. W. D. C. Morgan, one of the owners of the mine, came to this city last season and investigated the different furnaces in use and the modes of working ore. After due consideration he chose the Stetefeldt, and Mr. Stetefeldt himself was employed to draw up the plans.

The building which is to cover the furnace, dust chambers and cooling floor, will be 46 ft. wide and 102 ft. long. The furnace will be built in the most substantial style, with a great many improvements in construction, which are the result of the experience at the Ontario mill, Utah. It is calculated to roast from 40 to 50 tons of ore, which is about what the mill will work, the ore being very hard.

The ore, after cooling, is taken to the leaching-house in cars. The leaching-house will be 104x38 ft. There are eight leaching-tanks of 12 ft. in diameter, and the necessary tanks for precipitating and for the solutions. For the conveyance of the solutions back to the upper tank again for re-use, a novel method is employed, the usual pumping system being dispensed with. Below all the leaching-tanks and vats is a tank connected with an air compressor, the pressure of air driving the liquid to the upper vat or reservoir. For the drying of the silver precipitate a centrifugal machine will be used.

The roasted precipitate will be melted in a reverberatory furnace with charcoal gas fire, this furnace being constructed with a peculiar removable hearth, so that the hearth can be readily repaired if it becomes injured by the matte which results from the melting of the bullion.

The plans for the furnace, drying kilns, leaching tanks, etc., were all made by Mr. C. A. Stetefeldt, and the position of the batteries and engines had to conform to these more or less. The engine combines all the latest improvements, and is acknowledged to be the most complete machine which has come out of this shop, which is noted for its first-class work. In beauty of finish and neatness

and compactness in design, it is of a type which cannot be surpassed.

The improvements are more particularly in the details of construction. The engine is a 24x60 inch, with a box frame instead of the usual Allen frame. The advantage of this is that it is unusually strong, and at the same time economical. The frame, being cored out, gives as great strength as used to be gained with double the material. It weighs above 11,000 lbs. The pillow block is light in construction, but strong and durable. Its peculiar form gives it an advantage in adjustment of the quarter brasses; that is, in taking up the wearing surface of the brasses on each side of the pillow block.

The cross-head is adjusted by a nut setting it out to the surface of the slides in the frame. This admits of a free adjustment, and of getting it in perfect line.

The eccentric rods, valve rods and cut-off rods all have first-class bronze for journals, thus giving a better bearing surface, with no liability to heat.

The fly-wheel is 18 ft. in diameter, and weighs 30,000 lbs. The main pulley is 16 ft. in diameter, 43-inch face, and is made in 8 separate pieces bolted together. It works on a 13-inch shaft. The valves are made of bronze, and all the working parts of the cut-off are steel and every nut used in construction is case-hardened. The engine is fitted with Phillips' improved metallic packing.

The valve motion and cut-off is that invented by Eugene O'Neill, chief draftsman at the Union, and who recently patented the improvements through the MINING AND SCIENTIFIC PRESS Agency.

A ball governor is used, having a sleeve at the lower part of the spindle, which moves up and down upon the spindle by the expansion or approach of the governor ball. The governor is so arranged that an upper cup on this spindle can be partly filled with shot according to the speed at which the engine is to run. By this means the exact speed can be regulated without any change of belt. The steam valves are placed vertically above the exhaust valves, the seats being just far enough above the exhaust valves to leave clearance for the latter to work. The steam valve has a central hollow sleeve, and the stem of the exhaust valve passes up this sleeve and a stuffing box on the valve chamber cover, and is secured to a sliding bar or frame moving in suitable guides and raised by a cam oscillated by a crank arm and a pitman, and eccentric from the engine shaft. The late improvement by Mr. O'Neill more particularly refers to the intermediate mechanism which is connected with the governor, and which regulates the movements of the rocker arm and the trip mechanism of the valves.

A pair of bell cranks, pivoting on a horizontally reciprocating slide, have their ends connected to the cut-off rocker arms, and the other ends are connected to the sleeve on the governor spindle. The throw of the governor and its consequent action upon the valves is regulated by the variable weight, consisting of the receptacle or cup for the shot which surrounds the spindle, and is supported by the governor arms. Mr. O'Neill has done away with the inclines on his cut-off, and substituted bell crank motion, which works much better, as the point connecting the bell crank is always at the same level, and sometimes it used to be at a bad angle.

The stamps have dies and shoes 8½ inches in diameter, the heads being 8½ by 18 inches long. There are four cam-shafts 14 ft. 6 inches long, and 5½ inches in diameter. For these there are four wooden pulleys 6 ft. in diameter and 17½ inches face.

There are also two 9x13 Eclipse ore-crushers, and eight swivel dump cars. The No. 5 Knowles' pump is a very handsome nickel-plated finish, with a steam cylinder 7 inches in diameter, water cylinder 4½ and 10-inch stroke.

There is one pair of 54-inch diameter steel boilers 16 ft. long with 46 tubes 3½-inch. The double steam drums are 40 inches in diameter and 12½ ft. long. The mud drum is 30 inches in diameter and 14 ft. long. The stack will be 42 inches in diameter and 80 ft. long. The Crosby steam gauge, water gauge, revolution register, locomotive clock, and the Edison time recording and alarm gauge will all be set up in a handsome case in front of the engine. These Edison gauges keep a perfect record of the performance of the engine, and give an alarm in case the pressure rises above a specified figure. A set of fire tools, tube scrapers, 240 extra shoes and dies and a lot of miscellaneous articles not procurable in Mexico, go with the plant.

Among other improvements forming part of this machinery, is the heater, which was devised by the Union Iron Works recently. It is 30 inches in diameter, 9 ft. 8 inches high, and has 157 square ft. of heating surface.

This heater consists of a series of tubes secured vertically in a base by being screwed into place. Over each of these fits a larger tube which screws into the upper plate of the base. The tubes are only secured at their lower ends, thus leaving plenty of opportunity for expansion without injury. The feedwater is forced up the inner tubes to their tops, there overflowing and coming down the space between the two tubes, the outer ones of which are enveloped in the exhaust steam in the heater. This compels a circulation of the water and produces a temperature of 208 degrees, before the water enters the boilers.

The mines of the Rosario mining company are located in the Rosario mountain, a spur of the Sierra Madre, a distance of 100 miles from the port of Ajavampo, on the gulf of California,

to which there is a good road; about 90 miles from the city of Alamos where there is a mint, and about 30 miles from this city of El Fuerte. They are surrounded by an estate of 100,000 acres of land belonging to the company. At the base of the mountain about two miles from the mines, a number of streams unite and form an abundant supply of water. Here the mill will be erected and the reduction works established, the ore from the mines being brought on the wire rope tramway before referred to.

The Rosario mines were discovered by Don Bruno Esquer in 1852. They consist of a group of nine mines, under the following names. Dulces Nombres, San Jose, Bueno Fe, Carmen, San Genovera, Providencia, San Rafael, Sonorensis and Descubridora. They are on one vein and together embrace a distance of 9,600 ft. The vein is 4,000 ft. above sea level, and the adjoining valley 2,000 ft.

The work done on the various mines by the Mexican owners has all been of a rude and primitive character. The vein has been attacked only where an unusually rich place presented itself in the outcrop, and worked only so far as the great richness of the ore paid the owners well for the reduction by the rude processes employed for the purpose. Yet the records of the mines show a yield of over a million dollars. The vein is very wide, a cut of 42 ft. in one place failing to show the walls. Developments have chiefly been limited to the Dulces Nombres and Descubridora, on the east side of the mountain, and the San Rafael on the west side.

There is already at the mine a No. 4 Burleigh air compressor to run seven stopping drills, a saw mill to cut timber from the lumber on the property, a brick machine for making brick for the furnaces and houses, and also a mill for grinding sugar cane upon the ranch.

The Descanso ranch, belonging to the company, and on which the mines are situated, comprises 100,000 acres of land well watered and wooded, and perfectly adapted for agriculture, producing among other things Cuban sugar cane, maize, potatoes, wheat, bananas, plantains, oranges, etc.

Within a short distance of the Rosario and in the same range are many other well-known and profitable mines; among others the Trinidad, Jesus Maria and Quintana, in the State of Sonora, the Uriqui Batopilas, Morelas, Jocuistita and Guadalupe y Calvo, in Chihuahua, and the Palmarajo, in Sinaloa. The Rosario company is a New York organization, General Geo. B. McClellan being President, the other Trustees being A. Hegewisch, Hon. Hugh J. Jewett, Wm. H. Hays, Herman R. Baltzer, Hon. David A. Wells, Herman Drieler and W. E. Kimball. The general manager, a gentleman of wide experience and acknowledged ability, who is now at the mines, is Donald McNeil Palmer, Esq. The prime mover in the organization was W. W. McFarland, Esq., of New York, to whom is due the credit of having undertaken the project.

## The Suro Tunnel.

It seems to be a pretty well settled opinion upon the Comstock that the Suro tunnel has come under the control of the bonanza people, but as yet there is no official announcement of the fact. It is probable that if the bonanza people are going to boost the low-grade ores, the tunnel will be of great use to them, as they can save a dollar a ton by owning it. The *News* in speaking of the subject says that "the mines of the Comstock need the adit of the tunnel, and the draining facilities; and in the hands of no one will it be made more conducive to the workings of the lode than in those of the men controlling many of the principal mines of the lode, and those more particularly benefited by its operation. If the tunnel is in the hands of that firm, we may look for a more extended use of it. Money is needed to make the tunnel of the greatest utility to the mines, as well as to construct new works, and carry on operations through it. If the tunnel is in bonanza hands, the fact will soon be manifest."

It is very probable that the tunnel, by reducing the cost of handling and working the ore, will play an important part in the question of utilization of the low-grade ores. As to the tunnel itself, Supt. Thomas informs a Virginia *Chronicle* reporter that it is in fair condition from end to end, and there is no danger of its caving, as all the bad places have been carefully repaired and closely timbered. No preparations have as yet been made for receiving the water from the Yellow Jacket, Imperial and Belcher mines, but there is plenty of time to provide for this before the connection is made with the Yellow Jacket. A line of drain boxes will probably be laid in the south lateral drift of the tunnel, the same as is now laid in the north lateral. Indeed, this is the only way that the water can be taken off, as the drain in the bottom of the tunnel has not yet been finished up to the point where the fourth lateral makes off. It is by no means certain that the drain box in the main tunnel will be able to carry all the water that will be given it after the Jacket connection is made. If it is not, another drain box can be readily put in.

The new workings in Belcher are not entirely to search for low-grade ores. They are prospecting to open new ground south and west of the shaft on the 520 level, where lies a portion of the back ledge never yet explored. There are reasonable hopes of success in the venture.



## Extraction of Gold by Chlorination.

Among late improvements in chlorination processes for working gold ores is one invented by a citizen of Saco, Maine, which consists in exhausting or removing the air from the treating vessel, and supplying chlorine to replace the air and fill the vacuum created.

It is well known that chlorins will dissolve gold and other metals, and form valuable chlorides, which can then be leached out, leaving substances not attached by chlorine, and also such chlorides as are not soluble. This chlorine process is in common use, especially in making exact assays of gold ores and mixtures. It has also been applied as a working metallurgical method, but has been attended by many practical difficulties. Of late years it has been applied in the shape of the so-called "chloride of lime," (bleaching powder) which, when mixed with ore, upon the addition of sulphuric acid, liberates chlorine which dissolves the gold; or lime has been mixed with the ore, and chlorine gas passed into the mixture under pressure, so as to dissolve the gold; or a solution of chlorine in water has been digested with the ore, so as to dissolve and leach out the gold as a chloride. The process referred to differs from all these, and it consists, first, in exhausting the air from the vessel containing the ore prior to admitting this chlorine in the form of gas; second, in preparing the gas, and storing it in a gasometer, or holder, so that it may be supplied as wanted to the vessel containing the ores; third, in a device for manipulating the ores in suitable vessels, so that the necessary connections may not be easily disarranged, so that the gas is not allowed to escape to interfere with the workmen, so that there may be no useless waste of materials, and so that a complete control of the operation be secured. The accompanying drawings show suitable apparatus for carrying on the process.

B shows a chlorine generator of ordinary construction, whereby a mixture of common salt and black oxide of manganese and the addition of sulphuric acid, chlorins gas may be produced. Any other compound capable of producing chlorine in sufficient quantity may be substituted.

The chlorine gas passes by a pipe into a vessel, C, where it is washed in the ordinary way, and passes thence into the gas-holder, D, by a pipe. This holder is nicely balanced, so that it will rise and fall without pressure, or very slight pressure, on the holder and its connections.

The vessel, E, is for holding the ore while being treated, and may be called the "chlorinator." It is made very strong, so as to resist collapsing when exhausted of air. It may be from three to six ft. in length, in the form of a cylinder—say about three ft. in diameter.

F shows an exhausting air-pump, of ordinary construction, connected with this chlorinator by pipe and coupling. The chlorinator, E, is placed on rails or tramway, as shown, so as to be rolled from side to side, so that when the treatment is finished it may be rolled away to be emptied and replaced by other vessels. The chlorinator, E, may, if desired, serve as a leaching-tank.

The pit, G, serves for the workmen that handle the chlorinator.

H is a vacuum barometer or gauge to show the degree of exhaustion in the vessel, E.

The following is the way of using chlorine described by the inventor: Have a gas-holder, like any other holder for burning gas. Fill in any way as the gas is generated. When it is supplied and the holder is up, or partly so, let it balance on the weights, so that if the gas is sucked out the holder would descend by reason of the effective of external pressure due to the vacuum rather than by its own weight. This holder could stand ready for use. It may be made of lead, varnished with paraffine or other varnish not acted on by chlorine. A tube is run from the holder to an apparatus, like an old soda fountain, lined with lead, or may be made of stone or stoneware. In this vessel, which is called a "chlorinator" or "vacuum-chlorinator," the well-roasted ore, dry or damp, is put, and the air exhausted, so as to produce as perfect a vacuum as possible by an air-pump, or by other means. By means of the pipe leading from the gas-holder, the gas (chlorine) is allowed to enter slowly or rapidly, as occasion may require, into the chlorinator and mingle with the ore or metal to be operated on by the pure chlorine.

The gas penetrates among the particles, fills the spaces or interstices, and acts on the particles as well as on the surface of the pile of ore. The chlorinator is now tumbled or rolled so that the ore in it may be tumbled over itself or agitated while the chlorine is combining with the gold or other metals.

As the chlorine enters into combination additional quantities are drawn into the chlorinator and exhausted from the holder. Since the gas combines with the metal of the ore, and is thereby condensed, the effect is produced by exhausting, not by pressure. By this means (exhausting) the chlorinator is free of all air, vapor and gases, the surfaces of the particles of ore brought into perfect contact, and a more perfect action insured, as there are no other elements to conflict with the action of the chlorine. Chlorine being heavier than air and some other gases, it tends to remain on the ore at the bottom of the apparatus and not to escape. Now when all action has stopped—that is of the chlorine on the metal—a stream of

water may be let into the chlorinator at this level of this ore, or beneath it, and thus raise the remaining chlorine out of the ore into the spaces above, and by filling the chlorinator with water the remaining gas can be driven back into the holder, raising it up in proportion to this quantity forced back; or the chlorine can be blown away by air simply by attaching a tube to a blacksmith's bellows or any other blower and blow air through the chlorinator and deliver the air and chlorins wherever desired. When chlorination is complete the ore is to be taken out, either wet or dry, and leached with water to take out the metallic chlorides.

It will be seen that this invention obviates the use of strong, tight pressure-cocks and jacks, that must be used where pressure is exerted.

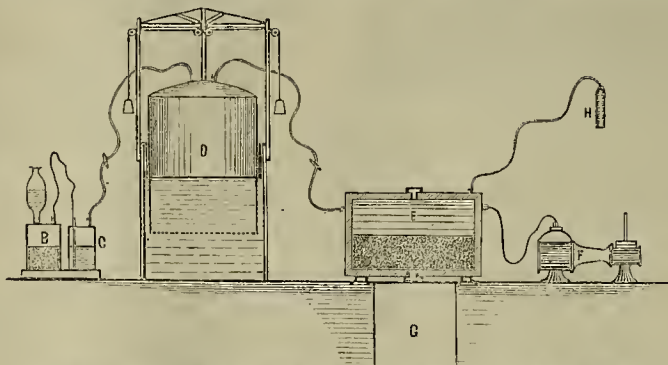
In this process the whole operation is on the principle of vacuum rather than on pressure. Using an air pump to exhaust the air and gas from the ore is claimed to ensure a clean, perfect contact for the chlorine.

There need be but little waste of gas. That which is not absorbed by the ore can be blown or forced back to the holder by the same pipe it came in by, and to act on the other one in another chlorinator. This would get rid of strong coupling, since all joints and pipes might be made of india-rubber and slipped into the tubes without nuts and screws, no pressures being used.

The inventor says that pressure and impurities are what he wants to get rid of. The use of chlorine under pressure is troublesome to the operator and corrosive to the apparatus employed. By generating the gas in separate vessels, keeping it pure and apart from the ores, and using it pure, the gold chloride, when filtered, will be free from lime sulphate, as is not now the case when the chloride of lime and sulphuric acid are used with the ore in this chlorinator under pressure.

## New Mining Regions.

It looks now as if in addition to the rapidly increasing tide of travel to Arizona and New Mexico, there will be an excitement northward,



BOYNTON'S APPARATUS FOR CHLORINATION OF ORES.

and Alaska and Idaho will also increase their population by several hundred miners. The Wood River country in Idaho is attracting great attention, and already many miners are preparing to go there as soon as the weather will permit. The winter has been a rough one there. The snow fall at Bellevue has been so far almost 75 inches on a level. At Ketchum there was 150 inches. Most glowing accounts of the richness of these mines have appeared from time to time, and during the winter many strikes have been made which appear to sustain the opinion that the camp will be a permanent and rich one. The Smoky district, which is in the Wood River country, is also attracting attention. In the Saw Tooth district in the same region, most encouraging results have attended the operations.

The recent reports from Alaska have attracted toward that Territory a great deal of attention. We have heard of the organization of several prospecting parties who are going in that direction. We gave in a recent issue of the PRESS quite an extended account of the late discoveries in Alaska, written for us by Mr. Pilz—who, by the way, the compositor named Mr. Bilz. This is the most extended account we have seen. It must be remembered, however, that there was previously an excitement, and men were sent up last year to work the Henrietta ledge five miles from Sitka, but on arriving, found there was "no money in it." They returned to San Francisco by the next steamer. But just after this a party employed by Mr. Geo. E. Pilz returned, and brought the rich free gold quartz which he described in his letter. This renewed the excitement. The mines are on the mainland to the eastward of Douglass island, Stephen's passage. A number more men were sent out, and they found at an elevation of about 1,500 ft., embedded between secondary granite and basaltic rock, six true lodes of auriferous quartz carrying galena and black sulphide of silver. A river cuts completely through the lodes, and prospecting in its bed yielded from 50 to 80 cents a pan, promising rich placer mines. The lowest assay of the quartz was \$150 in gold a ton, and several reached as high as \$3,500 a ton.

We shall keep our readers posted as to any developments in any of the localities where so much interest is now turned,

## Completion of the New Trans-continental Route.

An event of more than usual interest was consummated in rather a quiet way on Tuesday, the 8th inst., namely, the union of the rails of the Southern Pacific railroad with the Atchison, Topeka & Santa Fe railroad. The approaching completion of a second trans-continental railroad through a section of country rich in mineral resources, and on a parallel of latitudes that exempts the new road from the heavy snow storms which so often embarrass the operations of the more northern and hitherto only rail route across the country, had been watched with much interest by the people of this State, who are now to be congratulated upon their increased railroad facilities. The southern portion of California has for months been reaping substantial benefits from its railway connections with Arizona, and its present prosperity will be greatly enhanced by the extension of such connection to the East. Arizona and New Mexico are now fair and rich fields for California merchants, manufacturers and producers to cultivate, the careful tilling of which will greatly enrich our State, as well as proving profitable to the individuals who reach out for the newly opened markets.

The following dispatch from Deming Junction, New Mexico, gives a brief account of the driving of the last spike: The Atchison, Topeka & Santa Fe made connection to-day at this point at 3:45, San Francisco time. There were present R. R. Colman, Manager of Construction of the A. T. & S. F. R. R.; A. Longstreet, of the Southern Pacific; J. H. Bates and J. F. Kilalea, of the same, and others. The silver spike was driven at 3:45 by the above-named gentlemen. Engineer O'Neil, of engine 503, Atchison, Topeka & Santa Fe, ran the first engine from the Atchison to the Southern Pacific road. There was no further demonstration. Through mail and postal facilities have all been arranged. The first through train will leave San Francisco at 8:30 on the 19th, and make the trip through to Deming Junction in 60 hours. It was generally understood that

## The World's Fair of 1883.

The Executive Committee of the World's fair, to be held at New York in 1883, are holding frequent meetings at their rooms in that city, and report a gratifying increase in popular sentiment everywhere; not only in this country, but in Europe as well. Gen. Grant has added much strength to the enterprise, and has taken hold of it with energy and determination. Mayor Grace, of New York, who is Chairman of the Finance Committee, is fast doing away with the temporary differences which beset the enterprise at its outset, and is now meeting with decided success in his efforts to interest and organize the support expected from the business men of New York.

The Centennial exhibition, although a grand success, was an experiment, and did not elicit anything like the full interest of all the States of the Union. Some, indeed, did not participate at all; but those that made appropriations were amply reimbursed in the advantages which they derived. The only regrets over the grand results have been formed in the minds of people whose States failed to make appropriations to enable their citizens to share in the benefits.

This was especially the case with California, but the recent Legislature found time in the midst of a greatly disturbed and exciting session to unite in a strong majority for the passage of a bill appropriating \$5,000 "to provide for a proper representation of the products of California at the next World's exhibition, to be held in New York, in 1883." The amount is small, but it is amply sufficient for all preliminary work; and there can be no doubt but that the next Legislature will supplement this appropriation by whatever additional amount the wants and needs of exhibitors may seem to require.

The States and Territories will determine, each for itself, the manner and character of their exhibitions. Some will prefer to make full exhibitions; others to exhibit specialties. Some will prefer to furnish their own exhibition buildings, after the manner of Kansas and Colorado at Philadelphia. Others will seek space in the buildings of the Commission. It is yet too early to forecast what may be the policy of California, but at the proper time this matter will take shape, according to circumstances. Efforts will soon be made to arrive at an approximate estimate of what will be the extent of California's exhibits, and the space which she may need. It has been suggested that a street of States should be laid out in one of the principal buildings, similar to the street of Nations in the main building at the Philadelphia exposition. Such a design, if properly carried out, would form an imposing feature in the exposition, and would do much to excite an honest spirit of emulation among the exhibitors from the different States. An avenue of States has also been suggested, with buildings for State exhibitions, like the Kansas building at Philadelphia, where the great mass of the exhibits of the several States could be aggregated. For such a plan the great grain-producing States of the West might make their exhibits more prominent by introducing them in bulk; the Southern States would have ample room for their bulky products of cotton, rice and sugar; the mining States, their combined products of mine and field, and the New England States their manufactures, etc. Such an arrangement would be especially favorable for adding interest and zest to "State days," which will be set apart for the different States for special State ceremonies. This feature contributed largely to the interest of the exposition of 1876.

The times are propitious. The country, and indeed the whole world, is fast entering upon an era of remarkable prosperity. Our experimental exhibition of 1876 surprised both ourselves and Europe; and the announcement of another American International exhibition for 1883, is awakening interest abroad, far beyond that which was created in 1876. Our people, our merchants, our capitalists, our manufacturers and our producers of every class, should and will be fully aroused to the importance of the work in hand. The exhibition of 1883 will be commensurate with the growth of the country, and worthy of the exalted purpose to be accomplished in aid of the united industries of the world.

## Academy of Sciences.

The regular meeting of the Academy was held last Monday. Among the donations to the Museum were large shrimps from J. P. Moore. These are what were recently mistaken at San Rafael for young lobsters. From D. J. Staples, a four pound striped bass, 20 inches long by 7 inches deep, taken outside the Golden Gate, from C. S. Capp, a peculiar gold fish; from W. H. J. Brooks, a lizard, mole and white gophers.

Mrs. J. G. Lemmon read a very interesting paper on Pacific coast ferns, giving not only a popular but a scientific account of them.

Dr. Harkness read a paper on a new grape root fungus. We shall give this paper in full. The President read a paper on Alaska's system of Internal Water Communication, by Ivan Petroff. This we shall also give in a future number of the PRESS.

HEAVY snows in Scotland have blocked all traffic.

the Presidents of the two roads would be on the ground at the union to-day. The following congratulatory telegram was sent by Governor Fremont and the Arizona Legislative Assembly: Prescott, March 8th.—The congratulations of the eleventh Legislative Assembly of Arizona are tendered to the Atchison, Topeka & Santa Fe and the Southern Pacific Railroad Companies, upon the junction of their roads, an event which will mark a new era in the prosperity of our Territory, and which gives a second great transcontinental route for the trade and travel of the world. Signed, J. C. Fremont, Governor; Murat Masterson, President of the Council; J. F. Knapp, Speaker of House.

WOOD RIVER.—We take the following items from a letter to the Salt Lake Tribune: The winter is but half over and our communication with the outside world is open by way of Blackfoot. Mails are as regular as clockwork—six times per week to all points on the river. The snow fall at Bellevue this winter has been about 75 inches on the level. The Wood River mine owners of late are greatly pleased to learn of the new discovery in the Maud May, in Green Horn gulch. This property is owned by some New York men, who have kept two Utah miners at work this winter on the same. Ten or twelve days ago they came back very much elated over the fine appearance of the mine. They had, as they reported, followed down their shaft on the hanging wall for over 230 ft. without finding any regular body of mineral. One of the party made a suggestion to cross-cut the lead, which led to the discovery of a body of galena and carbonates over five ft. in thickness, assaying over 100 ounces in silver, and very rich in lead. The ore lay on the foot wall in a lime formation.

The tin mines of Cornwall are all looking well, and producing large quantities of tin ores, from which considerably increased dividends will be paid in the year 1881, for there is a strong feeling among those well able to form an opinion that the price of tin in the next 12 months will advance at least 25% to 30% per ton. There is at the present moment a great demand by capitalists for the investment of money in good Cornish tin mines, both of a dividend and progressive character.



### Subterranean Heat and Plant Life.

During a discussion the other evening, at the California Academy of Sciences, on the subject of the change of climate in Arctic regions, the question of subterranean heat and plant life came up. One of the members said he thought Greenland once had a warm climate, as British explorers found the *Sigilaria* and palm leaves impressed upon its fossil sandstones, and the qualities of coal and coal formations found there could only have existed in quite a warm climate. Some eminent French physicists think that all life started at the Poles, as these points received less of the heat developed by the sun. Tigers are considered as tropical animals, yet they are now plenty in eastern Siberia and Manchuria.

The presiding officer was opposed to the theory of cataclysms because he did not like to contemplate such things as possible. He argued that earth had formerly a higher temperature throughout its entire surface, and during its continually cooling process the present tropical plants have gradually moved toward the equator from the Poles, as the Poles become colder.

Dr. Kellogg thought that all theories which were based on the supposition that subterranean heat influenced plant life, were incorrect. In the course of a life-time study of plants, he had seen no evidences of subterranean heat assisting plant life. He thought the sun had the most to do with the existence of vegetation. He based his opinion on his experience, and gave the following example as a proof that subterranean heat has no decided influence. When last in Alaska he took occasion to visit a large active volcano, and during a trip of four days passed many others which were still also active. He traversed extensive fields of volcanic scoria, and gathered plants in every direction. He paid particular attention to the situation of the plants, as any hotanist would. In following up his work, he had occasion several times to dig under the surface soil, and at a depth of 10 inches, it was so hot he could not hear to touch it with his finger. Yet no indications of this were evident on the surface. The heat was not perceptible. He did not see here any more flourishing vegetation than elsewhere. There were plenty of plants, but they showed no more vigor than in other situations near by. It did not seem as if this subterranean heat, so close to their roots, influenced them at all.

L. K. DRAIS writes from Florence, Arizona, to friends in Winnemucca that the country is ten times more desolate than Nevada. There are some good mines discovered, and as there are a good many capitalists ready to buy mines, it ought to be a good place for prospectors; but labor is not in demand, and there are three men for every job. All the freighting business is carried on by companies who have their own shops and employ their own mechanics. Outside teaming is carried on by Mexicans, who use oxen for wheelers and mules or horses for leaders, and it is not unusual to see a team of six animals composed of horses, mules and oxen.

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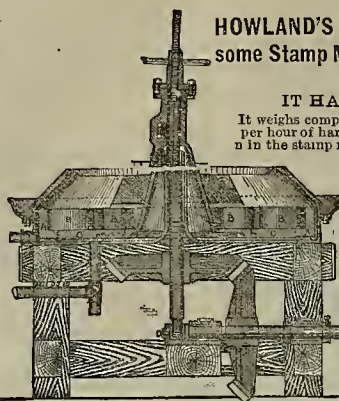
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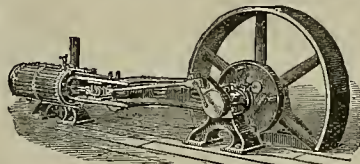
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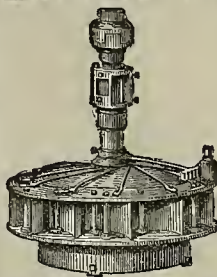
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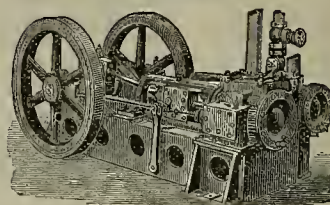
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### A Card from Architects.

**The California Architect and Building Review.**

Office, No. 240 Montgomery Street, San Francisco, Cal.  
It is with pleasure that we publish the following from prominent Architects in this city:  
Believing that a journal of this kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally, and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Parkins, Wright & Sanders, S. H. Williams, Thos. J. Webb, F. Huern, John Marquis, McDougall & Son, Wm. Mooser, Wm. Carlett, Meeker & Banks, W. C. Hoagland, S. & J. Newsom, B. Henrickson

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The attention of Assayers, Chemists, Mining and Milling Companies is particularly called to the complete stock of Balances, Furnaces, Crucibles, Brass and Steel Wire Screens, etc., including all the necessities for Assayers and Miners, as also for Milling men. An experience of 30 years in this line of business enables me to guarantee a trial attendance to the orders which my friends may entrust to me. Gold and Silver Tables and a full list of articles to be found in my store, to be had on application.



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I am prepared to demonstrate, if miners will bring me from 500 pounds to a ton of their ores, that I can save from 25 to 100 per cent. more than any other machinery now in use. I will make no charge.  
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520 FIFTH ST, cor. Bryant, San Francisco.  
Assaying and Amalgamating, Ores Tested, Jewellers' Sweeps Worked.



## An Improved Electro-Medical Apparatus.

(CONTINUED FROM PAGE 161.)

The switch, *L*, breaks or closes the circuit in the positive or negative poles. The six-lever switch, *K*, connects all the before-mentioned parts of the apparatus together. No part or parts can be used unless the levers controlling their action be moved to the right or the left as the case may be.

The entire apparatus is so arranged that no shock can be given unless special combinations are used for that purpose.

Dr. Williams is now erecting a stationary apparatus for administering medicated vapors to the lungs, throat and nasal passages for disease of those parts. It is intended to use electricity to illuminate the parts for purposes of examination.

## The Powder Explosion.

The explosion which occurred in the works of the Eureka powder company, near Berkeley, on Friday last, has drawn public attention once more to the manufacture of high explosives. Four Chinamen were killed outright and seven other persons were more or less seriously injured. The company is a new one, and they have only been manufacturing some three weeks. The officers of the corporation are N. K. Masten, President; Samuel Rosener, Treasurer; C. Van Dyck Hubbard, Secretary; Max Tschirner, Superintendent.

One theory of the cause of the explosion is that a Chinaman was smoking a pipe. Another is that some of the powder became scattered on the turn-table and became ignited by friction. Another is that it was caused by "overheating." Whatever the cause the explosion occurred and loss of life was the result.

The Eureka powder contained in its component parts chlorate of potash and picric acid, substances which are very dangerous to handle. There have been frequent examples of explosions from picric acid being used in the dyeing of wools. This is so well known that the use of powders from it and from chlorate of potash are prohibited in both England and France, and all the authorities are agreed upon its dangerous qualities. These are mentioned in Wagner's technology, Fownes' chemistry, Thompson's encyclopaedia of chemistry, the American encyclopaedia and elsewhere. The wonder is that an attempt should have been made to manufacture powder from these experiences, when their tendency to explode is so well known.

The *Post*, of this city, has an excellent article on this subject, explaining it so well that we can do no better than copy a portion of the remarks. This Eureka powder contains elements which, alone and unmixed, are frightfully dangerous, and when conjoined, doubly so. An eminent apothecary ventures the assertion that chlorate of potash will sometimes explode of its own gravity when loose and put in a box; and that when made into cartridges, the lower part is very liable to explode under pressure. Picric acid, which is mixed with the chlorate of potash, is also an explosive. The crystals are of a bright straw color, and used largely in dyeing silks, gloves, etc. Whole piles of silk dyed with this compound have been known to explode, and its mixture with chlorate of potash renders the powder made from it the most unsafe material known. There is terrible danger in mixing chlorate of potash with either sulphur, cyanide of lead, phosphorus, cinnabar, or even sugar. Picric acid is made chiefly by the decomposition of carbolic acid by means of nitric acid. Hafeneegger, who had two patents on the manufacture of explosives, hoped to overcome the danger of using chlorate of potash by combining it with fatty substances, such as butter, lard, tallow and oil; but the first experiment made with it killed the man who was loading the mortar, and Hafeneegger afterwards always kept away from his own experiments. The list of accidents from experiments with chlorate of potash as an ingredient of explosives is innumerable. A well-known chemist has written of it: "This astonishingly powerful compound was first discovered by the celebrated chemist Berthollet, in 1785, who proposed to substitute it for common gunpowder. When he first formed this salt he named it oxygenized muriate of potash. It appears to include the elements of thunder in its composition, and nature has concentrated all her powers of detonation, fulmination and inflammation in this terrible compound. A great many individuals have lost their lives or been dreadfully wounded in their attempt to manufacture gunpowder or blasting powder with this salt, and the lives of the two first workmen employed by Berthollet were sacrificed to the experiment, for immediately they began to triturate the ingredients they exploded with such violence as to blow them to atoms and destroy the whole building. This was in 1785, and for nearly a century, chemists have in vain endeavored to control the dangerous element. If only three grains of a mixture of chlorate of potash and any of the elements above mentioned are struck with a hammer upon an anvil, the report is as loud as that of a gun. The writer proceeds to show that the greatest objection to chlorate of potash is that it will ignite even by friction, and that its manufacture and use is too dangerous. It has already had its quota of victims on this coast. This does not imply, of course, by reversing the argument that all other

powders are safe, for carelessness often causes accidents, even in the manufacture of common gunpowder, but it does show that the powder under discussion cannot be either manufactured or used with any degree of safety. There are powders which can, with ordinary precaution, be manufactured and used without any danger, but none where chlorate of potash and picric acid are among the ingredients.

However, the purpose is not to show whether one explosive is safe and another fearfully dangerous to handle, but rather to put before the public the question as to whether an explosive ought to be made which contains such a fearful element as a combination of chlorate of potash and picric acid. In Dr. Ure's Dictionary of Arts (vol. 2, page 321) he says: "Picric acid was discovered in 1788," etc. "It is now readily manufactured from the coal tar product known as carbolic acid. This, when mixed with saltpeter or chlorate of potash, particularly with the latter, furnishes products which in violence of action more nearly resemble gun cotton and nitro-glycerine preparations than does any other explosive agent. Both mixtures are susceptible of detonation by friction, and especially that containing chlorate of potash, which is, indeed, inapplicable to practical purposes on account of its dangerous nature." The subject is not one that can rest here. The public is entitled to the knowledge as to whether any or all of these explosives are safe to handle. It does not want to know what any writer thinks, but what are the facts. If the materials used in the Eureka Powder Works are as dangerous to human life as Dr. Ure and other authorities say they are, then the existence of a factory where such powder is made is not only a crime against all concerned in making it, against the community where the factory is located, but against every miner who may buy it and use it under the belief that it is safe.

All powders to which we are accustomed, can be used without danger by those who understand their properties. Dynamite, gun cotton, and even ordinary gun powder are more or less dangerous, but being from daily use familiar with them we are, with due precaution, able to utilize them with comparative security. To try and improve on the compounds which can be used safely might result in great benefit to the scientific world, but further experiments in chlorate of potash compounds seem to present obstacles which, from the inherent chemical properties of the substances used, nature itself has made unconquerable. If it can be proven that these combinations will explode spontaneously in a state of rest then their manufactures should be prohibited by law. It has been shown that the idea of the recent explosion having been caused by Chinamen smoking in the cartridge house is chimerical. Chinamen do not smoke in powder works. How it did occur will probably never be known; but if the data and points that have been gathered for this article are at all reliable, it is certain that no powder should ever be made where picric acid and chlorate of potash are two ingredients. There have been railroad collisions and accidents where dynamite and other terrible explosives were among the freight, and where no harm has resulted from the concussion; but these powders, as shown, are of a far different nature, and are invaluable to the miner, without endangering his life. The question as to which is or is not the best and safest blasting powder is one which may come up hereafter; at present the point most interesting to the public is whether there are powders manufactured which endanger the lives of all who make or use them.

## Agricultural Implements.

## Manufacturing Industries.

It is only within about the last two decades that most of the farming tools and agricultural machines used on this coast were imported at great risk and immense expense, as well to our wholesale dealers as to the people who had to purchase and use them. And it is not a little strange, now, that while we have the iron, the timber and the skilled labor to fabricate everything in this line, there should still be so much importation carried on, manifestly to the serious detriment of our struggling home enterprise, and the pecuniary aggrandizement of our Atlantic manufacturers and shippers. By small increments, however, agricultural manufacturing industries are beginning to assume a prominence and importance, here at home, justly to the lasting honor of those enterprising spirits who have had the business courage to embark in these far-reaching and worthy undertakings. It matters not how lavishly a country may have been blessed by natural advantages, it cannot be said to be truly independent until such time as it has gotten to be wholly self-supplying in all those varied manufactured materials and appliances in popular use, as vital to its prosperity as the productions of its fertile soil.

We believe there is enough latent genius in our California artisans to invent and manufacture anything in the agricultural line, from the simplest plow or harrow to the most elaborate and complicated reaping or threshing machine; and we believe, too, if a commensurate inducement were brought to bear by our home dealers and home consumers, this inventive faculty could be aroused to such a degree of fruitful energy as would well surprise and startle our most sanguine people. It is hopeful to be able to state that we have already within our borders, factories where many first-class agri-

cultural implements are turned out which will bear favorable comparison with similar articles emanating from Eastern establishments. Among these, we take pleasure in calling attention to the well-known and popular Stockton Gang Plow and Manufacturing Works, Mr. John Caine, sole proprietor. This business was established in 1860, and after a 20 years' prosperous career, it is yet rapidly growing in importance.

Mr. Caine is also proprietor of the Globe Iron Works, his warehouse and office being located at Nos. 205 and 207 El Dorado St., corner of Market, Stockton, Cal. A full list and description of the articles manufactured by Mr. Caine would require a respectable volume, and we can only give a synopsis of them here. Among his agricultural appliances may be enumerated headers and mowers, derrick forks, barb fence wire, wheels, gears, pulleys, belts, Baxter's Improved Stockton headers, Stockton gang plows, etc. From his iron works he turns out steam engines, for steamboat and stationary purposes, horse power, pumps, house fronts and quartz, saw and grist mill irons. Mr. Caine is also agent for the celebrated Improved Studebaker wagone for 1880, and agent for the Pacific coast for Root's rotary force blast blowers for ventilating mines.

But enough has been said to show that these works occupy the foremost rank in the growing home manufacturing industries of the Pacific coast, and the men who thus hazard their time and money to serve the people in these great undertakings, are the ones to be encouraged and patronized.

## Mining in Mexico.

A correspondent writing to the *Leadville Circular* from Alamosa, Sonora, Mexico, says: The climate is magnificent for seven months in the 12, and we have four or five months of pretty hot weather, but can stand that better than the cold and snow. To-day the thermometer in my room stands at 58°. It ranges right along from 58° to 64°. We have occasional winter rains besides the regular rainy season, so that everything looks fresh and green. It is a country of endless resources. Everything grows here from coffee and sugar cane to Indian corn, and of the latter they raise as high as three crops a year. As for the mines, I think it is the coming country. You know better than I the amount of attention Mexico is attracting in the United States. The country is overrun with experts and agents, from Clarence King down to many not so well known. Much property is being picked up, and American capital is pouring in rapidly. If care is exercised in the purchase of properties, I see no room for failures, as good mines are plenty, mines that have produced their millions, worked in the crudest manner. It is easy to arrive at actual facts about the production of various mines, as the bullion pays a coinage tax, and the mint records show the figures. I suppose that more or less bullion is smuggled out of the country, so that a person taking the mint returns will come under rather than over the fact.

There are many desirable features of working here, and one of them is cheap labor. We utilize lots of Indian labor at 50 cents a day, and get the work as well done as you would pay \$3 a day for in Leadville, for nothing but main strength and awkwardness is required. They do as well as anybody, and even in the mines I have a lot of "teniteros" who get 75 cents a day, and they can strike a drill as good as any man you ever saw; so, you see, by putting one of these men with an experienced white miner how much it reduces the average expenses.

"A PLACE IN EVERY CABIN."—THE MINING AND SCIENTIFIC PRESS is not only full of good reading for the miners, but is wide awake to their interests, and ought to have a place in every cabin. It has a weekly "Mining Summary" gathered in goodly part from the local newspapers in the mining districts of the western States and Territories. For instance, all the important news of Georgetown Divide appearing in the *Gazette* is copied in the PRESS, thus heralding to the world the mining interests of this section. Therefore, it behooves us to publish only authentic reports of mining transactions, and we hope that those furnishing us with accounts of mines will give the real facts and nothing more.—*Georgetown (El Dorado Co.) Gazette*.

THE commencement of work to connect the Forman shaft with the Suro tunnel is worthy of notice. The Jacket drift is 1,513 ft. from the surface. The Forman shaft works are 12 ft. lower than the Jacket works. This would bring the Forman shaft drift at a depth of 1,501 ft. from the surface; or, allowing for grade, about 1,495 ft. The surveyed line of the south branch of the tunnel runs 200 ft. west of the Forman shaft, and the distance from the Jacket shaft to the Forman shaft is 3,450 ft., as the surveyed line of the tunnel runs.

THE Treasury officials estimate the surplus revenue for the remaining four months of the present fiscal year at \$45,000,000. The sinking fund will require \$8,000,000 to complete it. By the end of the present fiscal year, according to their estimate and exhibit, there will be a surplus of \$37,000,000 available, between now and June 30th, with which the Secretary may purchase and cancel bonds.

## News in Brief.

EARTHQUAKE at London and at Naples. SEVERAL lives lost by wrecks on Rockaway beach.

The report of the plague in Mesopotamia is fully confirmed.

FRANCE has decided to recall its representative in Venezuela.

SEVERE rain and snow storms on the Atlantic coast and in Canada.

BUENOS AYRES desires immigration from Ireland and Germany.

THE snow blockade continues in Illinois, Wisconsin, Iowa and Minnesota.

PORTUGAL consumed nearly as much American wheat in 1880 as Germany.

STATISTICS show Gilroy to be the chief cheese manufacturing township in the State.

MILES CITY, Dakota, has been flooded by reason of the ice gorges in the Tongue river.

THE steamer *Sultan*, with 100 emigrants on board, was sunk in the Humber, on the English coast.

The insane asylum near Danville, Pa., was destroyed by fire Saturday night. The building contained about 500 patients, none of whom perished.

A CARTRIDGE manufactory has been opened in Constantinople. It is provided with American machinery capable of turning out 30,000 cartridge daily.

It is asserted that within 18 months 2½ miles of the proposed channel between England and France will have been excavated, and that the work will be completed in about four years.

ALDERMAN SAUSS' resolution was adopted by the New York Board of Aldermen, asking the corporation counsel if there was any way of stopping the walking matchee, which he denounced as frauds.

THE Spanish treasury exhibit a deficit of \$300,000,000, the Government is overwhelmed with debt, and the revenue is on the decline. Alfonso had better go into bankruptcy or compromise with his creditors.

EVEN Asia has not escaped an exceptionally severe winter. In Japan there have been snow storms the like of which are not remembered to have occurred in 40 years. The snow is 10 ft. deep in the fields and 15 ft. on the hills.

A SERIES of most terrible shipping disasters occurred on the Aberdeenshire coast last Saturday morning, when no less than nine vessels were wrecked and 100 lives lost. One vessel was the Liverpool ship *Ben Rhydding*, from Calcutta. All the crew, 30 in number, perished within eight of land, the rocket apparatus being unable to reach the vessel.

DODSON, President of the Local Government Board, said that there were no cases of trichinosis in England. He hoped there was no real cause for alarm; but, in view of the action of foreign governments, a circular addressed to the local sanitary authorities has been printed, empowering the medical officers of the Boards of Health to carry out the provisions of the act ordering the examination of all pork exposed for sale.

THE Royal Spanish Academy has decided to open a poetical competition in London, to celebrate the forthcoming second centennial anniversary of the poet Calderon de la Barca. The contributions are to be in honor of Calderon, and in the English language. The Archbishop of Dublin, James Russell Lowell and Lord Houghton, have been appointed jurors. The successful competitor will receive the gold medal of the Academy and a diploma.

THE forged telegram designed to cause the Board of Trade to take action against American pork, were received in the House of Commons on Tuesday last, while an influential deputation from the Liverpool provision trade were actually there to interview Nundella, the Vice-President of the Councils, and to advise him against action similar to that of France. The telegram purported to be from the Secretary of the Liverpool Provision Guild. The police are investigating the matter.

It is apparent there is to be a tremendous pressure brought to bear upon the President for the removal of persons now in office, and the appointment of new applicants. At one time, Tuesday, fully 500 office-seekers were at the White House endeavoring to get an audience with the President, and present their papers. Very few were admitted, and the President said emphatically to a Senator who had called with an applicant, that he would not make any removals at present, and intended to require all papers asking for appointments to come through the proper department.

VALUABLE IMPROVEMENT IN THE BESSEMER PROCESS.—The Pittsburg Steel Casting Company are about to erect a Bessemer plant, for the purpose of making steel castings, and a superior quality of pig iron. This plant will be on an improved plan, under patents, by which they claim to be able to save 50 per cent of labor, and make ordinary Bessemer steel, and in 40 minutes change it into good open-hearth steel, or in one hour produce a steel of as good quality and more uniform than crucible steel; also, with a five-ton converter and five-ton open-hearth furnace, to produce in a given time, eight times the quantity of open-hearth steel that can be produced by the present process. Parties interested are at liberty to call and examine the models, at the works of Pittsburg Steel Casting Company, corner 26 street and Allegheny valley railroad.



The Californian.

THIS RISING MONTHLY OF THE DAY. YEARLY SUBSCRIPTION \$4. Single number 35 cents. AGENTS WANTED in every town and village of the United States to canvass for this popular magazine. The most liberal commissions will be paid to responsible parties. This is a chance to make money at your own home. Address: THE CALIFORNIA PUBLISHING CO. (P. O. Box 2310) 202 Sansome St. S. F.

Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St. S. F.

HALL'S VEGETABLE SICILIAN HAIR RESTORER is a scientific combination of some of the most powerful restorative agents in the vegetable kingdom. It restores gray hair to its original color. It makes the scalp white and clean. It cures dandruff and humors, and falling out of the hair. It furnishes the nutritive principle by which the hair is nourished and supported. It makes the hair moist, soft and glossy, and is unsurpassed as a hair dressing. It is the most economical preparation ever offered to the public, as its effects remain a long time, making only an occasional application necessary. It is recommended and used by eminent medical men, and officially endorsed by the State Assayer of Massachusetts. The popularity of Hall's Hair Restorer has increased with the test of many years, both in this country and in foreign lands, and it is now known and used in all the civilized countries of the world.

FOR SALE BY ALL DEALERS.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving specimens of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their notions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and each binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

THE State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M. daily, (Sundays excepted). Henry O. Hanks, State Mineralogist.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE

Northern Belle Mill and Mining Company.

SAN FRANCISCO, MARCH 10, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 11) of Fifty (50) Cents per share, was declared payable on Tuesday, March Fifteenth (15), 1881. Transfer books closed on Saturday, March Eleventh (11), 1881, at 3 o'clock P. M.

WM. WILLIS, Sec'y.  
Office—Room 29, Nevada Block, No. 300 Montgomery Street, San Francisco.

DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, MARCH 2, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 26) of Seventy-five (75) Cents per share, was declared payable on Saturday, March Twelfth (12), 1881, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.  
Office—Room 29, Nevada Block, No. 300 Montgomery Street, San Francisco, Cal.

DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company.

SAN FRANCISCO, MARCH 1, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 15) of Twenty-five (25) Cents per share was declared, payable on Tuesday, March Fifteenth (15), 1881, at the office of the Company, Room 19, No. 328 Montgomery Street, San Francisco, California. Transfer books will be closed March 10, 1881.

JOSEPH NASH, Sec'y.

ANNUAL MEETING.

Notice is hereby given that at a meeting of the Stockholders of the Paris Mining Company will be held, in accordance with the By-Laws of said Company, at the office of said Company, Room 25, No. 310 Pine Street, in the City and County of San Francisco, California, on Tuesday, the Twenty-second (22) day of March, A. D., 1881, at one o'clock P. M., of said day, for the annual election of Directors, and the transaction of such other business as may properly come before the meeting. Transfer books will be closed on Friday, the Eighteenth (18) day of March, 1881, at three o'clock P. M.

WM. J. TAYLOR, Sec'y.

Office—Room 25, No. 310 Pine Street, San Francisco, California.

Booth Gold Mining Company.—Location of principal place of business, San Francisco, California.

Notice.—There are delinquent, upon the following described stock, on account of assessment No. 3, levied on the second day of February, 1881, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
L A Booth, trustee.....	34	1,000	\$30 00
L A Booth, trustee.....	35	205	8 85
L A Booth, trustee.....	37	1,000	30 00
L A Booth, trustee.....	119	250	7 50
L A Booth, trustee.....	26	5	15
Hugh Burns.....	120	50	1 50
R Chenery, trustee.....	100	0,275	183 25
R Chenery, trustee.....	17	5	15
Thomas Day.....	148	500	15 00
T H Gordon, trustee.....	68	1,000	30 00
T H Gordon, trustee.....	112	100	3 00
T H Gordon, trustee.....	114	100	3 00
T H Gordon, trustee.....	116	100	3 00
T H Gordon, trustee.....	117	100	3 00
T H Gordon, trustee.....	118	100	3 00
Honory Oilmore.....	38	300	9 00
R Hunter.....	121	25	75
G A Miller, trustee.....	40	100	3 00
G A Miller, trustee.....	41	100	3 00
G A Miller, trustee.....	42	100	3 00
G A Miller, trustee.....	43	50	1 50
G A Miller, trustee.....	45	50	1 50
G A Miller, trustee.....	40	45	1 35
G A Miller, trustee.....	74	325	0 75
G A Miller, trustee.....	75	300	9 00
G A Miller, trustee.....	19	5	15
Geo R Spinyee, trustee.....	95	1,000	30 00
Geo R Spinyee, trustee.....	149	500	15 00

And in accordance with law, and an order of the Board of Directors, made on the second day of February, 1881, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the Auction Rooms of John Middleton & Son, No. 116 Montgomery St., San Francisco, Cal., Monday, the 28th day of March, 1881, at the hour of 2 o'clock, P. M., of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

WM. J. TAYLOR, Sec'y.  
Office—Room No. 44, No. 314 Pine St., San Francisco, California.

Blue Bird Mill and Mining Company.—

Location of principal place of business, San Francisco. Location of works, Olohe District, Pinal County, Arizona.

Notice.—There are delinquent, upon the following described stock, on account of assessment No. 1, levied on the eighth (8) day of January, 1881, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
West Evans.....	2	6	\$00 30
James Daly.....	1	6	00 30
W H Knight, trustee.....	5	100	5 00
W H Knight, trustee.....	6	100	5 00
W H Knight, trustee.....	7	100	5 00
W H Knight, trustee.....	8	100	5 00
W H Knight, trustee.....	9	100	5 00
W H Knight, trustee.....	10	50	2 50
W H Knight, trustee.....	11	50	2 50
W H Knight, trustee.....	12	50	2 50
W H Knight, trustee.....	13	50	2 50
W H Knight, trustee.....	14	50	2 50
W H Knight, trustee.....	15	50	2 50
W H Knight, trustee.....	16	50	2 50
W H Knight, trustee.....	17	50	2 50
W H Knight, trustee.....	18	100	5 00
Edward Bennison.....	3	6	0 30
Edward Bennison.....	44	100	5 00
John T Soule.....	39	150	7 50
J T Soule.....	25	300	15 00
J T Soule.....	26	200	10 00
J T Soule.....	73	25	1 25
J T Soule.....	74	25	1 25
J T Soule.....	75	25	1 25
J T Soule.....	76	25	1 25
J T Soule.....	77	50	2 50
J T Soule.....	84	200	10 00
J T Soule.....	86	18,500	925 00
J T Soule.....	101	50	2 50
J T Soule.....	83	00	4 50
Warren Holt.....	32	20	1 00
Edmund Bragdon.....	34	500	25 00
Edmund Bragdon.....	35	500	25 00
Edmund Bragdon.....	48	1000	50 00
T M Wattle.....	38	200	10 00
Geo Bennison, trustee.....	40	100	5 00
Geo Bennison, trustee.....	41	100	5 00
Geo Bennison, trustee.....	42	100	5 00
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F P Thompson.....	58	1000	50 00
F P Thompson.....	39	3125	156 15
F P Thompson.....	08	2500	125 00
M Griffith.....	55	750	37 50
Isaac W Smith.....	59	1000	50 00
W C Manson.....	62	200	10 00
David Grum.....	88	6245	312 25
Donald MacKenzie.....	04	200	10 00
C B Rawson.....	92	50	2 50
G B Rawson.....	03	100	5 00
Netty Grady.....	95	50	2 50
E B Perrin.....	00	1551	77 55
Mrs Mary Chamberlain.....	102	10,000	500 00

And in accordance with law, and an order of the Board of Directors, made on the eighth (8) day of January, 1881, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, No. 10 Market Street, on Monday, the fourteenth (14) day of March, 1881, at the hour of 2 o'clock, P. M., of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

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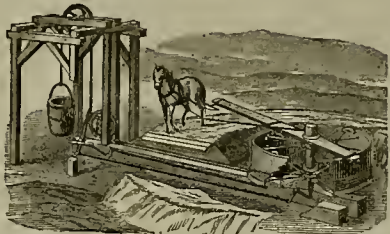
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NOTICE.

TO ALL WHOM IT MAY CONCERN: Notice is hereby given that George Denton Cardew is no longer a Director of the Isabelle Gold and Silver Mining Company, of London, England, Limited, and that any Power of Attorney which he may have had from said Company was invalid, for the reasons set forth in the following Resolutions:

1. Resolved, that as the Power of Attorney given to Mr. Geo. Denton Cardew on the 24th of August last, was not duly authorized, and the seal of the Company was affixed thereto without the authority of a duly constituted Board of Directors, the Directors of the Company hereby repudiate all acts and things done, or caused to be done by Mr. G. D. Cardew, under or by virtue of such Power of Attorney, and that by way of caution the Directors of the Company do rescind the said Power of Attorney, but without in any way recognizing the validity of such Power of Attorney, and such Power of Attorney is hereby rescinded accordingly; and that the solicitor of the Company inform Mr. G. D. Cardew of this Resolution, and request him to return to the office of the Company, the said Power of Attorney.

2. Resolved, that the Solicitor do forward a copy of the said Resolution to Mr. Lewis Chalmers, the Manager, at the Mines, and request him to advertise in such papers in California as he may think necessary, the said Resolution, or the purport thereof; and also the fact of Mr. G. D. Cardew having resigned the office of Director of the Company.

By order of the Directors, LEWIS CHALMERS, Manager.

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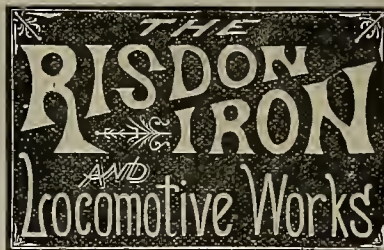
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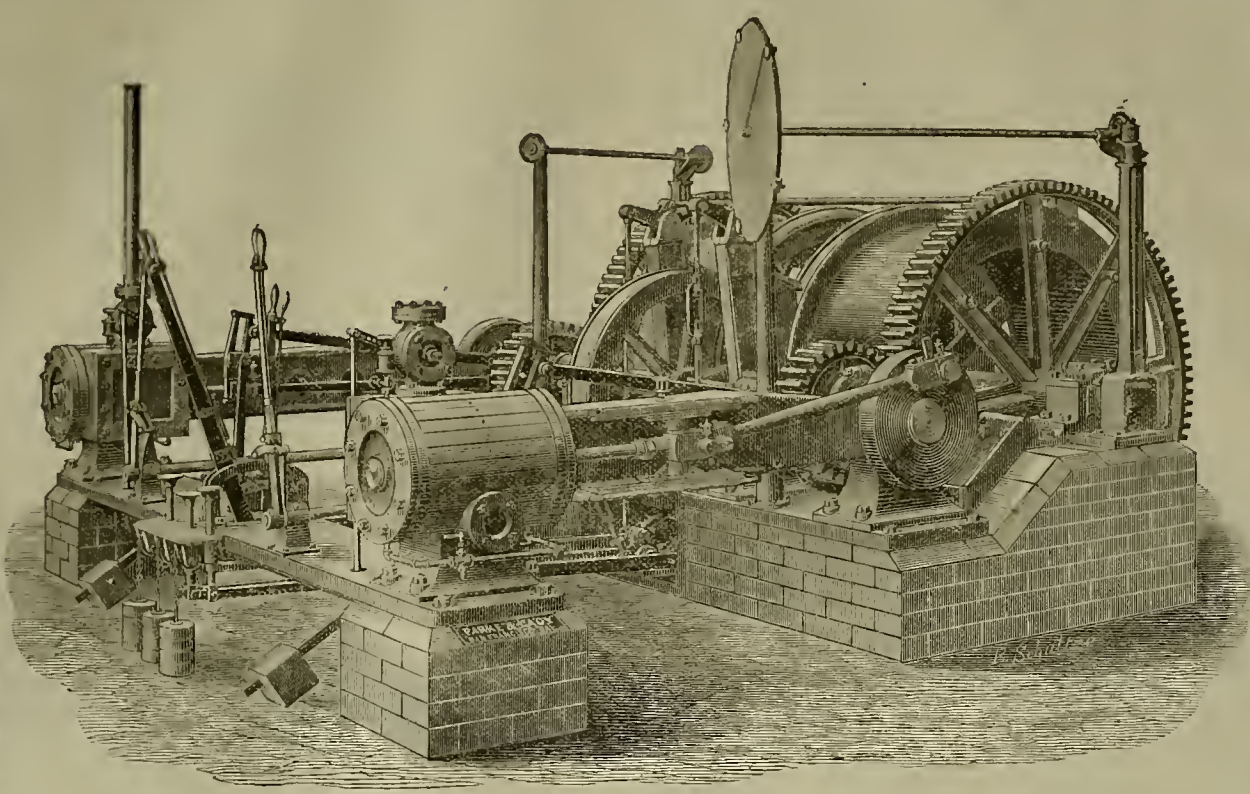


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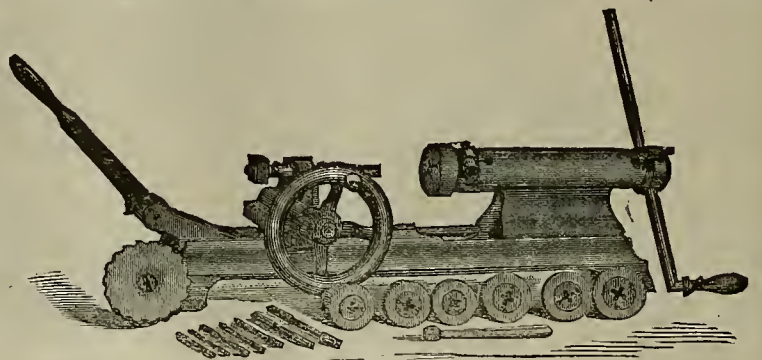
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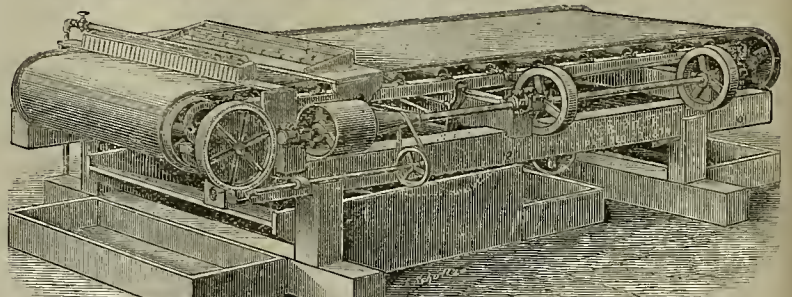
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO., Publishers. SAN FRANCISCO, SATURDAY, MARCH 19, 1881. VOLUME XLII Number 12.

## Underground Surveying.

Although several improvements have been made during the past few years in the construction of the theodolite and dial, and these instruments are now considered perfect for all practical purposes, there are, however, other instruments which the mining engineer and surveyor must use, and the much greater accuracy which is now necessary in making mining plans, to prevent encroachment and consequent litigation, makes it desirable to use the best instruments for securing precision. One of the defects of the present system of surveying is the method of transmitting a mark from the center of the dial to the roof of the tunnel or drift. The usual practice is to hold the line and plumb-bob with one hand above the instrument, and after getting the center the hand is removed to allow the mark to be made on the roof with the other hand. This method is too much dependent on guesswork, and for accurate operations, say, in the case where two headings have to meet, surveyors, although it sometimes entails a large amount of extra work, prefer to go over the whole distance again rather than rely on a mark made in this way. To overcome these difficulties, an English mining engineer, Mr. W. E. Garforth, of Normanton, has designed an arrangement of adjustable plumb-hob and holder, which we illustrate in the accompanying drawings, taken from the *Engineer*.

From this it will be seen that Mr. Garforth's new instrument, which is very ingenious and extremely neat in design, consists of a small brass box plate—with projections to prevent slipping when placed against the roof of the mine—on the under side of which the rack, C, is arranged to move backwards and forwards the projecting arm, which can likewise be worked at right angles by the second rack, D. By means of these motions the string connected with the plumb-hob can be moved to any required position by the wheels. A and B, which, although placed on one hollow spindle, work independently of each other. At the extremity of the arm a duplex center or gimbal motion—similar to that in use for suspending a ship's compass—is arranged to hold the rod, R, through which a string passes, to which is attached the plumb-bob which causes the rod, R, to hang in a perfectly vertical line whatever the inclination of the roof of the mine. The movable slide, T, which is bored to fit the rod, R, when lifted upwards either by a spring or by hand, as preferred, is consequently obliged to move in a perpendicular line. An adjustable screw cap, in which is placed the chalk or needle, is fitted to the upper end of the slide. The plumb-hob, L, is arranged with a lock nut, H, so as to allow the string between the instrument and the roof to be lengthened or shortened as required, and to obtain greater accuracy the plumb-bob has a long, adjustable, coarse-threaded screw, K, to enable the point of this plumb-bob to be brought in the closest contact with the glass of the instrument.

Now, assuming it is required to transmit a mark, the "dial center" is placed against the roof of the mine, the string adjusted first by the lock nut, H, and afterwards by the screw, K, the screws A and B, are then worked until the plumb-bob hangs exactly above the center of the dial, when the slide—which, for the reasons already explained, is caused to hang vertical—is next moved upwards, and the center mark made in the roof. To obtain even greater accuracy, and when the mark has to be made on timber, the screw, M, can be attached to the movable slide, and instead of a chalk mark a loose needle can be pressed and left in the plug or timber.

Mr. Garforth's "dial center" will, without doubt, prove a most useful adjunct to the dial, and a means of saving considerable time in setting out lines is now almost daily required, especially in those collieries where an extensive system of chain or rope haulage is at work, and where straight roads are found to work so much more advantageously, as compared with crooked roads. The plumb-hob used by itself will prove of service to architects and engineers, as there is often a loss of time in having to lengthen or shorten the line, which is so quickly adjusted by the arrangement shown.

## Selling Mines.

It does seem queer, when you come to think of it, that people who own what they consider good mines, always seem willing and even anxious to sell them. When a man goes to a new mining camp, he finds several dozen mines, which he is told are first-class, which can be bought cheap. Almost any of them will show ore running from \$100 to \$1,000 per ton, with several tons on the dump, and several hundred more in sight. Yet this mine will be sold—at a high price—for a couple of thousand dollars, or even less.

It seems as if the spirit of "trade" in mines is as firmly fixed as that of "trading" in horses. A man may own a horse which has all the points to make up a perfect horse—as every horse is supposed to have—and yet he will trade him off at the slightest provocation.

It is the same with a mine; especially a new and slightly developed one. The owner may

## Mining Statistics of the State of Nevada.

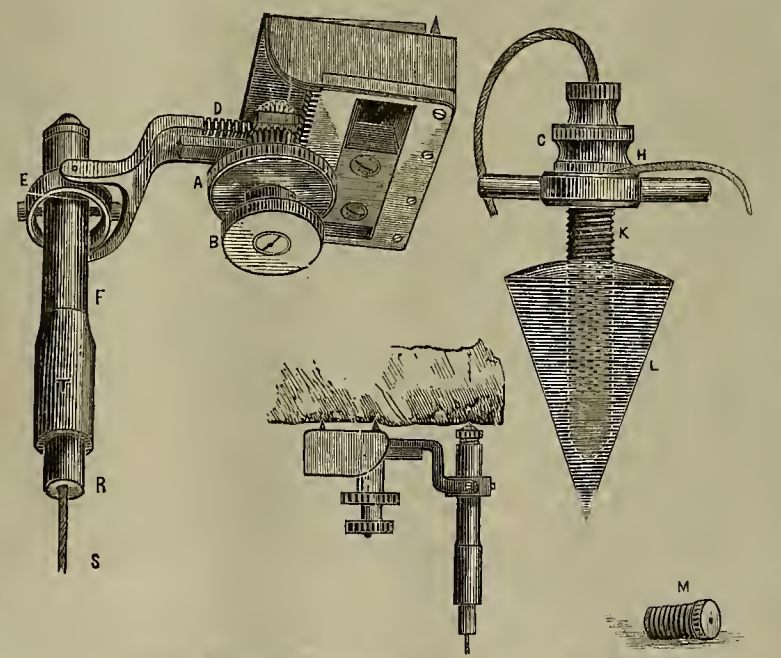
This State, according to the recently published report of A. J. Hatch, Surveyor-General, contains at the present time 108 ore-crushing mills and 26 smelting furnaces, by which latter there were last year smelted 98,825 tons of ore; 1,168,465 tons of ore having been milled meantime. Seven pan mills worked over 119,523 tons of tailings. These reduction works are of very variable capacity, each being able to put through from 2 or 3 to 40 or 50 tons every 24 hours. There are 10 mining ditches in the State having an aggregate length of 51½ miles, and a carrying capacity of 20,413 inches of water; also 569 irrigating ditches having a total length of 1,941 miles, and capable of irrigating 89,322 acres of land, 4 inches of water being used per acre. One borax mill located at Teal's marsh, Esmeralda county, manufactured 371 tons of refined borax.

The amount of mineral land in the State is

## Mining and Railroad in Mexico.

There is considerable excitement both as regards railroading and mining in Mexico. The mines are mostly discovered and being worked, but the railroads are mainly as yet on paper. It is not probable that the conservative people of that country will view the advent of American miners and railroad men with great rejoicing. Nor is it likely that the new roads will go through the country as cheaply and early as was expected. The inhabitants will in all probability throw every obstacle they can in this way. A dispatch from Tucson, Arizona, on the 16th says that parties in from northeastern Sonora report that the politicians of that State are very much opposed to the extension of the railroad in that direction, believing that it will result in virtually turning the Government over to Americans. The railroad is now replacing its Indian with white labor, and expects to push work much faster than heretofore. The railroad company also find considerable objections to locating the line of the road through Mexican ranches along the river bottom in the neighborhood of Ures.

The cheap labor calculated upon by the railroad contractors is not going to be as cheap as expected, since the laborers will soon learn that they are "worthy of their hire." A correspondent of the *Bulletin*, who is at Paso Del Norte, Mexico, writes that wages have advanced there. He says: "Laborers now receive 75 cts. per diem, being just double what they received a few months ago. Out of the 37½ cts. they had to provide their own food, and as the payment was in the copper money of the country, which is valued 10% below Mexican silver, and 20% below United States money, it will be seen that Mexican laborers have heretofore received less remuneration for their toil than the Chinese in California. There is quite a probability of a further advance in the price of labor here, as some Mexicans have been employed by railroad contractors on the American side at \$1 per diem and their board, and the contractor of the Texas-Pacific has advertised for 200 laborers at the same rate. As it is understood that grading will be commenced on this side of the river upon the return of the surveying party, a large number of Mexicans will find employment at wages approximating to those given on the American side. For an improvement in their condition, the laboring class of Mexico will be indebted to American enterprise, as under the sway of the European commercial element, which has dominated the country and retarded its prosperity, there was no hope for them."



A NEW INSTRUMENT FOR UNDERGROUND SURVEYING.

strikes a bonanza any moment, yet he is ready to take ready cash and let the next man have the chances for the bonanza. This has always been so, and probably always will be so.

Men will sit contented on a little dump at the mouth of a prospect hole, and wait for a purchaser, when a few blows of a pick might show them their fortune. But they know by bitter experience that the next blow may show them that their ledge has "pettered." They prefer the sure thing of the sale to the doubtful thing of working the mine. If there is any other reason we do not know it.

**THE NEW CONSTITUTION AND MORTGAGES.**—Judge Denson, of the Superior Court at Sacramento, has decided in an important case, that where a mortgage was given prior to the adoption of the new Constitution, the tax upon it must be paid by the mortgagee; that the new Constitution, directing a tax on mortgages, does not thus change a pre-existing contract, but only imposes a tax upon that which before was stipulated in the mortgage, an authority to the mortgagee to pay the taxes on the property, if the mortgagor failed to do so, and that such payment by the mortgagee should be covered and secured by the mortgage. The mortgagee paid the tax and sought to recover it with the debt, under foreclosure.

**TRAVEL** Bodieward from Virginia City is slightly on the increase.

estimated at 1,135,960 acres; grazing land, 5,606,061; timber land, 590,811, and farming land, 107,876 acres. Through the 9 wood flumes, 69 miles in length, there were last year floated 118,000 cords of wood and 28,000,000 ft. of lumber. The 17 railroads that traverse different sections of the State have a total length of 702 miles, this being exclusive of the Carson & Colorado narrow gauge road, of which nearly the entire track is graded and a portion laid with rails, 125 tons of mineral coal were mined and over a million tons of charcoal burned last year. From the Osceola mines, about the only placer mines now being worked in the State, \$30,000 worth of gold dust was collected. The assessed value of real property amounts in the State to \$10,984,331; personal to \$7,438,795; population, 59,529; voters, 18,889.

**THE NEW OVERLAND ROUTE.**—The telegrams from New York state that passengers by the new route—Atchison, Topeka & Santa Fe and Southern Pacific roads—left that city on Tuesday last. The passenger rates agreed upon between the Southern Pacific and the Atchison, Topeka & Santa Fe railroads are: From Los Angeles to Kansas City, unlimited first-class, \$112; limited first-class, \$104; limited second-class, \$78; limited third-class, \$52.50; from Los Angeles to New York, first-class, \$133.50; second-class, \$105; third-class, \$65; from San Francisco to New York by the southern route, the same as the Central.

**A SEVERE TEST.**—During the trial trip of the English steamship *Gainsborough*, a few weeks ago, the engines were stopped and altered from hard ahead to full speed astern in 23 seconds. The steamer is 231 ft. long, with a measurement of 1081 tons. The engines are of the compound, direct acting, inverted cylinder type, 150 nominal horse power, having cylinders 32 inches and 62 inches diameter, by 36 inches stroke. She made 12 knots.

**A COMPRESSED-AIR locomotive**, intended for underground work, ran 11 miles the other day, the engine commencing with an initial pressure of 1,000 lbs. to the square inch, and running down to 300 lbs. The load weighed 20 tons.

In the immense city of London the whole staff of firemen is only 483, very far less than one man for every thousand houses, and about one for every eight thousand people. Fires are increasing, as well they might.

The tunnel under the English channel will cost £200 per yard, or £352,000 per mile, being less than half the cost of the metropolitan lines, in which the cost of land is an important, though undistinguished portion.

The *Territorial Enterprise* says: It is rumored that the honanza people have bought the Wells-Fargo property, and will sink there another large east shaft. The report is generally believed in mining circles.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eos

### Review of the Beet-Sugar Industry in the United States During 1880.

EDITORS PRESS:—It is the custom in all sugar-producing countries, when the season is over, to lay before the public the general result of the season's work, and to point out the advantages or disadvantages encountered during that time, in order to form a correct judgment how to overcome them another season, if such a thing is possible.

In every beet-sugar producing country the manufacturers meet annually for three days, and discuss the whole industry from an agricultural, commercial, mechanical, economical and political standpoint. Thus it has been since the industry was in its earliest infancy, and this system of mutual consultation has no doubt done more than any other to bring the beet-sugar industry to the immense importance it at present occupies in nearly every European country. Could this be done in the United States, the result would unquestionably be the same; the difficulties exposed would be understood and might be overcome. Unfortunately, the territory of the United States is too large, and the harmony among the beet-sugar manufacturers too small, to accomplish a meeting of all the parties engaged in it; we have, therefore, to be content with a general review, and draw our conclusions therefrom.

During the year 1880-81, six beet-sugar manufactories have been to work; three in the Eastern States and three in California. While one has been standing still in California (the one at Soquel), another has had not even all its machinery tried (the one at Los Angeles); so that we might say more correctly five beet-sugar factories have been to work in the United States during the year 1880-81.

In the Eastern States, the beet-sugar factory at Portland, Maine, had its third and last season. It made, early in spring, contracts with 1,220 farmers for the cultivation and delivery of sugar beets. The result of all these contracts was to supply the factory with raw material for only seven weeks. Part of the machinery at Portland was made in Europe, and part in the United States; the whole worked satisfactory, the largest single day's work being done converted 185 tons of beets into sugar. Although the Maine Beet-Sugar Company had a subsidy from the State amounting to \$7,000 annually, yet the Board of Directors called a stockholders' meeting for the 2d of February to decide regarding the closing up of the works and selling the property of the company, which, it has been understood, was sold to a company in New York State. As a singular fact it may be stated here that, according to the official statement of the officers of the company, made to the Secretary of State under oath, the company made during the first season, employing the most simple home-made machinery, a little more sugar out of a ton of beets than they did the second and third seasons with the most complete imported machinery.

The Delaware Beet-Sugar Company worked for the second season this year. Their machinery is entirely of American make, and worked very well. The sugar they made was sold at satisfactory prices, and had they worked as many months as they worked weeks, would have had a very profitable run; but this was not possible for the want of raw material.

The beet-sugar works at Franklin, Mass., had the past year its first season. The complete machinery was directly imported from Europe, and embraced all that art and science have produced during the last years. The manager was also brought from Europe, and the building erected according to European plans. This sugar factory worked well, though not better than the other two, and during the four weeks' work was anything but a financial success; and, what is worse, there is no prospect that the year 1881 will bring to either of these factories a full supply of beets.

The quality of the sugar beets has been about equal to the average French, with from 10% to 11% of sugar; 73% to 80% of purity; but the price, independent of general expenses, has been nearer \$7 than \$6 per ton, delivered in the factories.

Neither of these three beet-sugar factories has the elements of life in it. Without a sufficient supply of raw material, at fair prices, no financial success is possible, and without this, no industry can exist for any length of time. In former years the managers were blamed for all financial shortcomings, and the result was the hitherest recriminations among the leading men, who lost entirely sight of the axiom: Without sugar beets no beet sugar.

In California the beet-sugar works at Alvarado had an average season's work and a fair supply of beets at moderate price. The machinery employed there is of a promiscuous nature, partly made in Europe and remodeled here, and partly made here in the first place. The quality of the beets is good, and the only apparent drawback appears to be the difficulty of keeping the beets for a sufficiently long winter campaign. If the beets are placed in silos, as is the general custom in Europe, they will

heat and sprout in a wonderful short time, and if placed within easy reach of the factory, they are apt to suffer from frost at night and warm sunshine during the following day. This prevents the season to be carried into the spring, as it would be most desirable to ensure financial success.

The sugar works at Isleton had a short revival this year. The machinery was made partly in Bohemia and partly in San Francisco. The machinery is old-fashioned, and rather miniature, though good sugar can be produced with the same; but the location on an island in the Sacramento river, with its water level generally above the beet fields, is a most unfortunate one. These circumstances, taken all together, a financial success could hardly be expected.

It begins to be well understood that the beet-sugar industry will eventually gravitate to localities where the raw material can be obtained in ample quantities, of a fair quality and at moderate prices; in fact, where the sugar beet can find a home. The raw material, and not the machinery, is and has been the great obstacle to success, and although complete and sufficient machinery is very desirable, and to financial success essential, yet when the first barrel of beet sugar was made in Illinois, at which Bro. Emery, editor of the *Prairie Farmer*, assisted, and at which empty nail kegs were substituted for charcoal filters, he declared enthusiastically: "It is easier to make a barrel of beet sugar than to boil a pot of good mush."

While all the difficulty the beet-sugar industry has encountered in the United States during the season 1880-81 points in the same direction toward the supply of raw material; while the machinery in all the sugar works has done equally well, whether made of the newest pattern in Europe or made at home, we find a most singular exception in the Los Angeles enterprise. The farmers in Los Angeles county took with the most surprising readiness to raise sugar beets. Ten times the quantity desired could have been contracted for. The cost of raising sugar beets proved to be less than anticipated, and the result unexpectantly good. The quality of sugar beets proved to be of a fair average, and the attempt to dry them by solar heat on the fields on which they were grown, a most perfect success, although not all the drying turned out well, for want of the necessary care and attention. Sugar beets planted in January and February last year were fully ripe in July, and could have been worked into sugar since then at any time up to the present day directly from the field. There are hundreds of acres of sugar beets standing in the field in as fine a condition as any sugar manufacturer could wish to see and work. Farmers feed them mostly to their cattle, and yet they express not only a willingness to raise another crop, if there is a chance to manufacture them into sugar, but are really anxious to do so.

In no part of the United States can sugar beets be grown with such a facility and produce so sure a crop at so small a cost, as in southern California, and though this industry met with a set back last year through the blunders of those engaged in it, yet it is not impossible that eventually sugar factories will locate here. Whatever may be said of the wine and fruit raising advantages of southern California, farmers are pretty unanimous in the opinion that it is no grain growing locality, while root crops are every year sure and immense. Had any one of the three Eastern beet-sugar factories had the large and cheap supply of sugar beets of Los Angeles they would have coined money, notwithstanding that sugar in the East is from 2 to 2½ cents per lb. cheaper than in California.

If the peculiar advantages and disadvantages of the beet-sugar industry in the United States has encountered in the different localities where its introduction has been attempted is once correctly understood, a great step towards success has been accomplished.

ERNEST TH. GENNERT.

Los Angeles, Cal.

THE COAL FIELDS OF ARIZONA.—Of the extent and character of the recently discovered coal fields in Arizona, the *Journal* says: "The valley on Deer Creek is about 10 or 12 miles long, and forms a natural basin. Last Wednesday, George Martin and George Cook in prospecting found croppings, shale and ledge matter, which cover almost the entire surface of from 800 to 1,000 acres of land. The ledges in several places crop out, with a dip of 20° to the southeast. From breaks in the surface of the land and a washout where the water has cut through, it is evident that one of the ledges is at least 20 ft. thick. The others will have to be prospected before the owners can determine their extent. It is certainly a wonderful discovery of magnificent coal beds. The discoverers brought some fine samples to town, which were tested yesterday in a blacksmith shop, and they burned beautifully. It is bituminous coal of a superior character, specially adapted to railroad or machinery of any kind. In the last few days persons have gone thither, and are prospecting the valley in search of coal. Many locations have already been made. These coal fields are about 18 miles from the San Pedro valley, and can be reached by a road going up Deer Creek valley. The line of the projected railroad from Globe to Tombstone is right along that valley. Messrs. Martin, Cook, Oates, Wicks and others have taken up two sections of 160 acres each, and propose to commence operations in connection with the same at an early date.

### The Murchie Mine.

During the 11 months ending Dec. 31, 1880, the Murchie mine, Nevada county, as stated in Supt. Schuyler's annual report, has produced 5,924 tons of ore, the percentage of sulphurets being 3.76. The product was as follows:

5,924 tons of ore worked by company, 1,614 ounces bullion.....	\$26,313.07
70 tons sulphurets worked by company.....	676.01
139 tons sulphurets worked by Pioneer reduction company, of Nevada City.....	16,574.98
37 tons worked by Ireland & Aaron, Melrose.....	5,512.24
40 tons of sulphurets sold abroad.....	4,934.00
31 tons of first-class ore worked at Pioneer reduction works.....	1,935.00
Total.....	\$50,210.30

The average yield per ton was as follows:

Free metal.....	\$4.42
Sulphurets.....	4.90
Total.....	\$9.32

The cost of mining, milling and reduction of sulphurets was \$8.37 per ton.

During the same period the company has sunk a new three-compartment shaft, which is now at a depth of 404 ft. The various levels have been extended 2,530 ft. A 78-ft. winz has also been sunk. A commodious shaft-house has been erected, and new and powerful hoisting machinery set therein. The total amount expended on the mine and in making these improvements is \$98,393.10.

A chemical analysis of the first-class ore, made by Prof. Schaeffer, of Cornell University, gives the following result:

	Percentage.
Silica.....	74.203
Sulphur.....	11.960
Iron.....	10.636
Lead.....	1.444
Copper.....	1.020
Alumina.....	.863
Silver.....	.056
Gold.....	.012
	100.244
Selenium.....	Trace.
Tellurium.....	Trace.

Hiko.—Good news comes from Hiko. Henry Raymond's mill started up on the 22d of last month, and has been running along ever since. When the stamps were first dropped the mill was not completed, but is now, with the exception of the roof, which will soon be completed. It was just about three months from the time that Henry Raymond first started shipping material for the construction of his mill till the first stamps fell. Considerable delay was caused in the transportation of material by the storms. The mill is a five-stamper, yet was constructed so five additional stamps could be added at any moment with but little trouble, and they are now preparing to put in place the additional stamps. This mill is situated in a canyon about 15 miles from Hiko, and the town site has recently been christened "Cassel City," in honor of Jack Cassel, the dashing Superintendent of the Green Monster mine. The mill has a supply of water sufficient to run a 20-stamp mill, which is furnished by a spring, and as the water is 18 ft. higher than the pans, it does away with the pumping of water altogether. The mine is situated one mile and a half from the mill, and the ore is all packed along the mountains on mules from the mine to the mill. The ore which is run through pulps from \$100 to \$150. The Green Monster mine is looking splendid, there being a large quantity of ore in sight. In the tunnel that was being run, a three-ft. vein was encountered, which is 90 ft. below the bottom of the shaft, and assays from \$150 to \$350 per ton. There are about 45 men employed at both mine and mill. W. M. Wilson says Henry Raymond will probably be in Pioche the last of the month with a load of bullion.—*Pioche Record*.

GOLD MINES NEAR BISHOP.—Quite a little excitement has occurred on Bishop creek over some gold ledges situated about 12 miles east of the town, in the west foot-hills of the Inyo range. One of the best is a three-ft. ledge belonging to Hypolite Galerón, from which, by means of a small aqueduct over the river, he last week cleaned up \$350 in gold after working five tons. The specimens all show gold in a free state, and the entire ledge would pay handsomely with proper milling facilities. Messrs. Keating & Baule, of Bodie, recently made an examination of the property, for which they offered \$10,000 and were refused. Extensions on this ledge, probably of equal value, belong to J. H. Stoutenborough and to Munzinger & Phillippy. Higher up on the mountain Gilbert, Sherman & Black have discovered some mines of the same description and equally rich in gold. The veins are contact, in slate and lime; small specimens of the ore may be seen at this office. It is to be hoped that the Bodie party may be encouraged to put up a mill.—*Inyo Independent*.

PYRAMID LAKE MINES.—Colonel F. F. Osbiston and Superintendent Smith, of the Belcher, who went out to Pyramid lake day before yesterday to take a look at the Jones and Kinkead and other mines in that vicinity, have returned. They brought home with them some samples of ore that present a fine appearance and assay well. It is one that can be very easily concentrated. It will be an easy matter to put six tons of it into one. This gives a ton of material rich enough to be sent almost any distance for further reduction.—*Virginia Enterprise*.

### Mining Altitudes.

Scientific men have proved by actual measurement that most of the great silver mines lie 10,000 ft. above the present sea level, and among the richest are some which lie 2,000 ft. higher still. Very rich mines have been found as high as 16,000 ft. It is a notable fact that as a rule the richest silver mines lie over 10,000 ft. above the sea level. The mines on Ruby Hill are between 8,000 and 9,000 ft. above the level of the sea.—*Ruby Hill Mining News*.

According to the above item Nevada is a notable exception to that 10,000 ft. rule, her richest mines, including those of Ruby Hill or Eureka mining district, lying considerably below that level. The *News* says that the general surface of the Comstock lode, which must be classed as among the most famous and richest of the silver mines of the world, is about 6,000 ft. above the level of the sea. The Sutro tunnel, which intersects the Comstock 1,600 ft. below the surface, is 4,400 ft. above the level of the sea. The rich bonanzas of the Crown Point and the Consolidated Virginia sections, which have yielded \$200,000,000, were nearly or quite down to the Sutro tunnel level. In point of fact, the deepest workings of the Comstock are less than 3,000 ft. above the sea level. There are no large bonanzas of ore found at that depth as yet, but there is no reason to believe that there will not be, extending perhaps far below the sea level.

NEVADA ASBESTOS.—Heretofore most of the asbestos used by the Asbestos Felting Company, of San Francisco, has been procured in Sierra and Plumas counties, California, but recently they have been obtaining the article from Elko. The asbestos shipped from Elko comes from a mine somewhere in that part of Nevada which is owned in part by Prof. W. F. Stewart. It is much superior to the California asbestos. The fiber is as soft and fine as cotton; indeed, a person not well acquainted with the mineral would at once pronounce a hunch of it to be raw cotton. J. W. Farrell, who is agent for this State for the felting company above-named, is now patching up the former coating of the Hale & Norcross boilers and steam pipes with this asbestos preparation. The good service done by the former coating at the time the works were destroyed shows the utility and excellence of the preparation. Mr. Farrell has coated all the boilers and steam pipes on the Comstock and in Bodie and other places with this asbestos felting. The big fire at the Hale & Norcross made very little impression on the asbestos covering of the boilers and pipes. It would doubtless have remained intact, but for the water thrown in upon it while it was hot. This caused some scaling off of the outer coat in a few places.—*Virginia Enterprise*.

WOMEN AND MINING.—There are many vocations at the present time which were, at one period in their history, almost exclusively monopolized by men, but are now being opened to admit woman, who has compelled recognition by her talent and ability. The ranks of the theologians and physicians show many women who well maintain the position they have sought and secured. Beyond a speculation in stocks, the business of mining has presented but few points of interest to the gentler sex. A case has recently come under the *Mining Review's* observation which is at least worthy of record. Mrs. B. C. Clark, by the death of her husband, came into possession of a number of mining claims, and in order to intelligently superintend their development, and to gain a knowledge of the science of mining, she has taken a course of study in Prof. Mardock's school of assaying and chemistry in Chicago. This lady has also studied the operations of machinery, smelters and crushers, and is thoroughly imbued with the spirit of mining. A woman, as a skilled writer on metallurgy and mining, or as a superintendent of mines, would be a new thing under the sun.—*Nevada Transcript*.

THE PROVIDENCE.—Judging by the satisfied look that owners of this reliable quartz mine wear they are "not losing money on their goods." The hurrying of their hoisting works last summer might have proved a considerable hindrance to less practical and energetic men, but did not to them. Before the ashes of the ruins scarcely had time to cool off they had a new and better building over the mouth of the 1200 ft. incline, and were sailing along as merrily as though they had never seen a fire on the claim outside of the furnaces where fires ought to be. Since then fortune has smiled continually on them. Over near the new shaft some big developments have been made. Tons and tons of the bonanza kind of rock has been coming out there for many weeks, and the deposit has evidently just been tapped. The big hoist-works over the new shaft, the erection of which has been delayed longer than was anticipated last summer, will be begun this month we understand, and before another winter comes the Providence will eclipse its former successful history.—*Nevada Transcript*.

THE RISING SUN mining company, whose mine is near Colfax, has just declared another quarterly dividend of 15 cents a share. The 10,000 shares of treasury stock, offered to the stockholders on January 25th, were all taken. The proceeds of this sale will be used to increase the facilities of the mine. The company still retains 85,000 shares of capital stock in their treasury.



MECHANICAL

PROGRESS.

Progress in Machinery.

One hundred years ago, when thread numbered 150 by the standard set up by spinners was considered the utmost degree of fineness possible by English spinners, a pound of cotton spun to such fineness would give a thread 74 miles in length, sufficient to reach from Boston to Concord, N. H. The machinery of to-day spins for useful purposes thread numbered 600—from one pound a thread 196 miles in length. And machinery has been constructed so delicate that a pound of cotton has given a thread reaching 1,061 miles—farther than from Boston to Chicago! The weaver of my boyhood could throw the shuttle perhaps 25 times a minute, but not at that rate through the day. Human muscle would break down under such rapid action. In 1850, Compton's loom threw the shuttle 50 times a minute, whereas so great has been the advance of invention, that the loom of to-day is considered a slow-moving mechanism if the shuttle does not fly 240 times a minute. "No man can afford to take as a gift to-day a cotton manufactory equipped with the machinery of 1850," was the remark of the late superintendent of the Amoskeag mills. "We are breaking up the machinery of those days for old iron."

In some departments of cotton manufacture, a man with the present machines will do eight times the amount of work which he could accomplish in 1860. In the manufacture of coarse cloth an operative with 10 machines does twice the work which he could accomplish with 13 machines before the war. There never was a period so fruitful in discovery, so fertile in invention as the present, and this reason is manifest. The first discoverers and inventors groped in the dark. They were ignorant of nature's laws. They did not know what force was. They had a limited comprehension of what the simple mechanical powers were. There was little accumulated wealth of research.

In contrast, the mechanic of to-day has all the discoveries, the experiments, the ascertained facts, mathematics of machinery, the laws of force at his command. He inherits the scientific wealth of all the past and makes it his capital. Instead of gazing, as it were, upon old mines worked out, he beholds mountain ranges filled with golden ore, and engages in his work with the stimulus of the needs of the human race, and the ever increasing wants of an advancing civilization.—*Sci. Am.*

Driving Nails by Machinery.

Nails are now driven by machinery in most box factories where sufficient system and repetition exist to make it profitable, one machine doing the work of 10 or 15 men. The general idea of these machines is as follows: The nails are fed by hand into bell-shaped holes in a revolving disk. These holes are arranged in radial lines, each line with as many holes as there are nails wanted along the side of a box. This disk revolves and delivers the nails into bent tubes, each nail to a separate tube, which delivers it to a kind of a pair of nippers arranged in a row with others. Upon receiving their nails, the nippers advance simultaneously, so as to bring each nail under a kind of stationary hammer, the point of the nail protruding below the embrace of the nippers. At this point in the operation, the box upon a sliding platform rises until the points of the nails penetrate it to a certain extent, when the nippers relax their hold and recede, the box still rising to receive the entire penetration of the released nails the stationary hammer acting upon the heads of them meantime. This nails one edge of the box; but all the edges having the same arrangement of nails are finished by a repetition of the above movements. Then, to do the ends, the boxes are transferred to other machines, or the same one can be re-adjusted when a sufficient number of boxes have been passed. These machines work with rapidity and precision, and not one nail in many thousands fails to enter properly. Self-feeding nail machines are beginning to occupy the attention of inventors with some degree of success.

CASTINGS.—Castings seem to take to themselves peculiar freaks of irregularities, the causes being difficult to define. They occur sometimes in the sand, sometimes in ramming, sometimes in venting, and often with wrong facings. For instance, the quality of facing sand must always be graded, according to the casting to be made heavy or light, deep or shallow in the mold. Again, inferior coal in facings sands is detrimental. Possibly the dealer in foundry facings has been grinding inferior stock, instead of getting a carbon in the form of coal dust to stand the iron pouring against the mold. There has been dirt and slate ground in with the coal. This is a cause of scabby castings, together with too fine a sand or a sand without body, which all molders dread except for very light work. If molders could only have good sands, good irons, and good facings, and the same stock supplied each time, there would be little need of complaint; but the geology of our country is not such as to admit of digging molding sand at every foundry back door, when molding sand costs from \$40 to \$50 a car delivered in a foundry yard, as we know it does in many instances.—*Amer. Machinist.*

Welding by Electricity.

SCIENTIFIC

PROGRESS.

It is well known that great strength, with proportionally light weight, may be obtained in wrought-iron structures by employing the tubular form of making up. The great Victoria bridge, the Menai Straits bridge, the hull of the *Great Eastern*, and many other modern constructions of wrought iron are cases in point. But the cellular structure also has its advantages. The comb of the honey bee has been often quoted as a specimen of the utilization of space. It is fully as instructive as an illustration of the judicious employment of material for strength. It will appear reasonable to suppose that a rectangular sectioned beam of wrought iron would be much stronger if its interior was a series of transverse braces formed of sections of a circular or angular form, and making a part of the structure itself. The difficulty in the way of such an achievement is the impossibility of forming these transverse braces and the longitudinal plates into a solid and homogeneous whole. Claim has recently been made by a bright mechanic, that he can, by electrical action, really weld iron in place, and he exhibits a piece of his handiwork that appears to be perfectly welded, and done, as he says, by the heat of electricity. He says that he has filled a rectangular beam of wrought-iron plate with short sections of wrought-iron pipe, placed side by side, or at distances apart, but at their ends meeting the top and bottom plates of the beam, and welding them *in situ* so that they form a honey-combed structure making a homogeneous beam. He insists that this welding is done by means of dynamic electricity, inducing a welding heat on the inner surfaces of the longitudinal plates and the ends of the engaging tubes. The claim, at present, rests solely on the inventor's statement and his exhibit of a small specimen, not large enough to give a practical value to his reputed discovery. If his sanguine claim could be made a practical possibility, its value in increasing the usefulness of iron in permanent structures would be immense, and his discovery would greatly modify some of the present methods of working fibrous iron.—*Design and Work.*

The Locomotive a Precedent for Higher Piston Speed.

Advocates of high piston speed, just now attracting some discussion and exchange of opinions, have a strong argument on their side in the locomotive as built and operated to-day. Certainly no more prominent instance could be cited in favor of the system. Here is a machine that depends upon high speeds of piston for its success, and is worked under more adverse and destructive conditions than a stationary engine is ever liable to, yet it undergoes no extraordinary wear and tear, while exerting greater power in the same space of time than the stationary engine. As regards mechanical construction, the locomotive engine displays the most advanced knowledge of the day, in the fitting up of parts, in proportion of wearing and bearing surfaces, and in working steam expansively, as far as the link motion is capable, while in mere endurance of shock and strain of varying loads, handled by different persons of more or less mechanical knowledge, it suffers more in a year than a stationary engine in a lifetime.

No other tools than those already in daily use are required; no mechanics other than those already trained, need training, so that if we are to build high speed stationary engines instead of low speed, the necessary appliances and precedents exist. In connection with this subject, and as a practical example of the truth of the statements above, engine 273 on the Pennsylvania railway may be cited. This engine was built in 1875, has 5-ft. drivers, and weighs about 38 tons. It has never been repaired until recently, two months ago, and in 49 months' continual use has made a mileage of 251,552. This is only one instance, but doubtless many more could be cited in favor of the practicability of economical high piston speed.—*Exchange.*

NEW METHOD OF GENERATING STEAM.—A French manufacturing firm, Messrs. Serpollet, have patented a peculiar method of generating steam. At each stroke of the piston of the engine a certain quantity of water is projected against two strongly-heated metal plates. The steam so produced goes direct into the cylinder, so that in this arrangement not only a special generator, but also the valve system for the entering steam, is superfluous. The mode of action is similar to Hock's petroleum motor. In the example given in *Dingler's Journal*, the vaporizing surface consists of two metallic cooes, one within the other, with an interval of about 0.04 inch between. The hollow space is divided into two chambers, each of which is connected with one side of the cylinder. The gases play first on the inner surface of the double cone, then on the outer.

MALLEABLE IRON is said by Forguignon to lie intermediate between steel and gray pig iron, differing from the latter by the special nature of its amorphous graphite and its greater tenacity, and from steel by its small elongations and large proportion of graphite.

RUBBER WHEELBARROW tires were first invented in England to prevent the noise of wheelbarrows in warehouses, railroad stations, etc. To accomplish this object a rim of vulcanized rubber is fastened around the tire of the wheelbarrow.

Unrecognized Qualities in Charcoal.

Among the numerous and varied properties possessed by charcoal, there is one—one, too, of the most wonderful—which does not seem to be adequately recognized, probably from its being imperfectly known except to physicists. It is that of being able to condense and store away in its pores many times its own bulk of certain gaseous bodies, which it retains, thus compressed in an otherwise unaltered condition, and from which they can be withdrawn, as required, as from a reservoir.

That eminent scientist, M. Saussure, undertook the task of a systematic examination of this subject, with a result which will prove surprising to the general reader. Operating with blocks of fine hoxwood charcoal, freshly burnt, he found that by simply placing such blocks in contact with certain gases they absorbed them in the following proportions:

	Volumes.
Ammonia.....	90
Hydrochloric acid gas.....	85
Sulphurous acid.....	85
Sulphuretted hydrogen.....	55
Nitrous oxide (laughing gas).....	40
Carbonic acid.....	35
Carbonic oxide.....	9.42
Oxygen.....	9.25
Nitrogen.....	6.50
Carburetted hydrogen.....	5
Hydrogen.....	1.75

It is this enormous absorptive power that renders of so much value a comparatively slight sprinkling of charcoal over dead animal matter as a preventive of the escape of the odors arising from decomposition. A dead dog having been placed in a box in the warm laboratory of an eminent chemist, and covered with charcoal to the depth of between two and three inches, could not be discovered to have emitted any smell during several months, after which time an examination showed that nothing of the animal remained but the bones and a small portion of the skin. To the large excess of oxygen over the nitrogen in the atmosphere, which, according to the above table, was absorbed by the charcoal, and which thus rendered harmless the noxious vapors given off by the carcass as they were being absorbed, is doubtless owing the fact above stated and the further fact of the charcoal never becoming saturated.

A reader of the *Scientific American*, who has been trying certain experiments on the value of charcoal as a convenient means of storing oxygen, reports favorably as to the results. In a box or case containing one cubic foot of charcoal, may be stored, without mechanical compression, a little over nine cubic ft. of oxygen, representing a mechanical pressure of 126 lbs. on the square inch. From the store thus preserved, the oxygen can be drawn by a small hand pump.

From the fact of the charcoal absorbing oxygen in so much greater proportion than nitrogen, we have here a means of utilizing its discriminative powers of selection in obtaining unlimited supplies of oxygen from the atmosphere, which contains nitrogen five times in excess of its oxygen, or 20%; whereas, by the separating or selective powers of the charcoal, the mixed gases capable of being extracted from it contain over 60% of oxygen. It only suffices to withdraw this now highly oxygenized air into another vessel of charcoal, by the further exposure to which the proportion of oxygen will be increased to a still greater extent. This indicates a most feasible means by which atmospheric air can be decomposed in such a way as to provide a cheap supply of oxygen.

One cannot readily recognize the fact, which is nevertheless true, that the condensing power of charcoal, as applied to ammonia, is equal to what would be obtained by subjecting this gas to a pressure of nearly 1,260 lbs. on the square inch.—*Illustrated Scientific News.*

A POWERFUL LIGHT.—The Brush Electrical Manufacturing Company at Cleveland, Ohio, has recently manufactured for use in the British navy an electric light, which has been tested and found to have a 100,000-candle illuminating power—a power 50 times greater than the ordinary electric lamp for street lighting. This is believed to be the largest and most powerful light ever made with human hands. It is designed to be used in night attacks, and to surmount the sea for torpedoes. A 40-horse power engine is required to produce the light. The carbons used are two inches and a half thick. The intense heat generated between the carbon points is half a million degrees, one-ninetieth the estimated heat of the sun. It is calculated that with an ordinary reflector a beam of light will be cast so powerful that a person 15 miles away can see to read by it.

AN ELECTRICAL ELEVATOR.—Dr. Siemens, who appears to be indefatigable in seeking to extend the sphere of usefulness of electricity, has brought out an electric elevator, which he has been exhibiting at Mannheim, Germany. Its construction appears to be simple, and suggests an easy method of putting in safety brakes. The cage is carried by wire ropes, having counter-weights, so that the cage, when loaded, is practically in equilibrium. The current generator at the base is electrically connected to the dynamo-machine in the cage, and the latter actuates two toothed wheels, taking into a metal rack running up the center of the passageway of the lift.

Perazotic Acid.

SCIENTIFIC

PROGRESS.

The discovery of a new compound of oxygen and nitrogen has been announced by MM. Hautefeuille and Chapuis. It contains more oxygen than azotic acid, and has been named by the French chemists perazotic acid. It is well known that on passing an electric current through oxygen a portion of the oxygen is transformed into ozone. If the ozone be mixed with nitrogen, the spectrum indicates the presence of a body characterized by black bands. The bands disappear when the gaseous compound is mixed with water, and the latter is acidified. The application of red heat to the gaseous mixture also causes the black bands to disappear. The experimenters are now endeavoring to isolate the new acid in order to study its properties. M. Berthelot some time since suspected the existence of the body in question during some experiments which he has not published. Its presence was indicated to him, however, merely by phenomena of coloration which appeared and disappeared during the passage of an electric current through a mixture of oxygen and hypoazotic acid. His observations were communicated to Messrs. Hautefeuille and Chapuis, who, by obtaining the spectrum, have placed the existence of the new acid beyond doubt. The discovery is the more surprising, as oxygen and nitrogen, being constituents of the atmosphere, have so long been the objects of what might have been considered exhaustive study.—*Design and Work.*

USES OF CHEMISTRY.—Let us give chemistry its true place. It has led the world's progress for half a century, and it will lead it with still more rapid strides during the next half century. It has preceded the practical man, lantern in hand, along all the untrodden paths of invention and discovery. It has become to every progressive industry what a cane is to the blind man. It does not follow, however, that we can depend upon it alone, nor that we can rely on every analysis handed us. Because the blind man finds a cane helpful, no one with unimpaired vision would be wise in shutting his eyes and walking with the aid of a cane. Still less would the blind man be wise to throw his cane away because it sometimes fails to detect an obstruction in his path. We have a right to distrust an analysis when it points to conclusions which cannot be safely accepted unproven, but the man who looks to the chemist for all the information which an intelligent study of the composition of matter can give him, will know more and act more wisely than the man who depends upon his practical knowledge or his general intelligence. When we are willing to pay for care, skill and experience in laboratory work, and the profession offers a career for ambitious young men who are driven from it by the lack of promising opportunities in this field, the general standing of chemical work will be raised, and there will be a longer list of names which, appended to analyses, will command confidence. Meanwhile, no one who spends money judiciously in learning all that the chemist can tell him will waste it, while the owner or manager of works who feels that he can dispense with the chemist's services, will make a mistake.—*Iron Age.*

SCIENTIFIC PROGRESS.—The recognized and frequently applauded tendency of modern investigation in natural sciences, has been toward an accumulation of facts, rather than toward any effort to generalize from them. As a reaction against the mania of speculation prevailing in the earlier stages of the development of modern chemistry, geology, etc., the direction taken has produced highly salutary results. The foundations thus laid have been broad and substantial, and the haze of doubt and uncertainty has been swept away in many departments of science, while new fields of research are constantly opening to a large number of intelligent and active workers. No one will be inclined to underrate the value of their labors, and yet it is difficult to escape the feeling that, notably in chemistry, this search for new facts is conducted without the proper discrimination. A mass of data is piled up without order or connection. It would be valuable material in the hands of those skilled in grouping and arranging it in such a manner as to secure a basis for further work. In its present shape, however, it is only raw material, and while a great deal of credit properly attaches to original investigation, it should be remembered that it is as great a thing to make a fact useful as to find it out.—*The Iron Age.*

AN ALUMINUM BATTERY.—Liebig's *Annalen* describes a novel and curious voltaic cell, which has recently been devised by Herr Wohler. The chief peculiarity is that both plates are of the same metal—aluminum—and a tolerably strong current is supplied. The cell consists of a glass vessel six inches high, filled with very dilute hydrochloric acid, or caustic soda, and containing an inner porous pot filled with concentrated nitric acid. In each compartment is placed a cylinder of aluminum provided with a projecting lug which passes through the cover of the vessel, and acts as a contact piece for the electrodes or conducting wires. As soon as the aluminum cylinders are plunged into the acids, a current is given off sufficiently powerful to heat a platinum wire red hot.

NUMBER OF PLANT SPECIES.—The total number of plant species existing on the globe, according to recent calculations made by Dr. Muller, of Geneva, is 250,000.







with free gold and black sulphurets. The location is most admirably situated, and surrounded with abundance of wood and water and a good road within 300 yards of the vein.

**DAY PLACER.**—We were shown a few days ago, by County Treasurer Thorne, 3 buttons of placer gold, valued at \$140, the result of a clean-up made by Mr. Sam Stoby, from his claims near the Toll House. These claims have been worked more or less every winter for many years, and still continue to yield gold in paying quantities whenever there is water to be had to work them.

#### KERN.

**STAKE.**—Kern County Californian, Mar. 12: A rich strike is reported in the Big Blue mine at Kernville. The company have been working in fairly remunerative rock hitherto, but lately they have struck the old west vein which was formerly worked with such good results, but which was lost several years ago. They have sent to San Francisco for a gang of miners, and will prosecute operations on a larger scale.

#### LOS ANGELES.

**LOOKING UP.**—Cor. Los Angeles Express, Mar. 12: Mining interests are looking up in this section after being long dormant. Some 25 men are at work on the Baldy bridge mine, near Ravenna, and many quartz ledges are being located. A lead that will yield \$100 per ton in this county is worth more than one that will yield \$150 per ton in Arizona. In the northern part of this county, near the head of Casteca canyon, there is a region that has been little prospected for mineral until recently. Several leads in this locality show very flattering prospects of mineral wealth.

**OIL.**—Developments in the oil region are showing a most satisfactory result, and the wells are producing better than ever before. Two new wells are now being bored, and a 10,000-barrel tank is to be erected at Now-hall immediately. One hundred barrels per day flow through 7 miles of pipe to the refinery, and thence most of it is shipped to the large refinery at Alameda, in its crude condition. About 30 men are now employed, and the demand for oil is rapidly increasing.

#### MARIPOSA.

**HOLSTROM.**—Cor. Mariposa Gazette, Mar. 12: Everything is at a standstill in this section. The No. 9 mill and mine has been shut down, and the little rattle-trap at Pool's is doing nothing. The ore taken out by the present company is as good if not better than any previously taken from the mine. Mr. Holting, the present owner, had an average assay made in San Francisco before he purchased the mine, and it went as high as \$9 per ton. But under the present process of running it through, and their new idea of amalgamating, it only worked (at this time) at \$1 per ton. The fact of amalgam being found 300 to 400 yards down the gulch below the mill is conclusive evidence that the present mode of working will not do. The Washington is still doing well. They are working the usual number of hands, and I saw some fine ore lately taken from the 1100 level of that mine. Messrs. John Bell & Co. propose to soon put up a 100-stamp mill on the Merced river for the purpose of working the rock from the Quartz Mountain vein situated about 1 mile west of Givens' ranch, and also for the purpose of crushing custom rock. They say that they can crush rock for \$1 per ton, and also transport rock from the Quartz Mountain mine at 50 cents per ton. They propose to build a narrow-gauge railroad from the mine to the mill.

#### NEVADA.

**MINING ON THE RIDGE.**—San Juan Times, Mar. 12: It is a very difficult matter to learn from the miners on the Ridge the amount of gold dust realized at each clean-up of their respective mines. We know enough, however, to say in confidence that the mines from French Corral to and including Moore's Flat, are paying well, and that the companies are well satisfied. The following are the mines of note in this township: worked by hydraulic, they are as follows: The Milton mine, at French Corral; the Manzanita mine, at Sweetland; the American, near this place; Bowen & King's mine, on San Juan hill; and the English mine, at Badger Hill. The Milton mine and the Manzanita mine belong to the same owners. They each utilize daily about 1,000 inches of water. The American company utilizes about 300 inches of water, and run about 100 stamps. Bowen & King utilize 60 inches of water and night. Bowen & King utilize 60 inches of water and night. The Badger Hill company have their own water in the winter season. In the summer season they obtain their supply from the Eureka Lake company. The Lone Ridge company expect to be able to commence washing about the 1st of April. They will utilize about 500 inches of water daily, and will obtain it from the Milton company. Only two of the companies named are corporations, to wit: The Milton and Manzanita; the others named are joint stock. George D. McLean and others are busily engaged in running a bedrock tunnel to drain their mining ground at Empire Flat, near French Corral. When this tunnel is completed, it will open up the richest mining ground in this township. In Bloomfield township there are but few companies at work worth mentioning. These are the mines of the Eureka Lake company at Columbia Hill, and the Malakoff company, near North Bloomfield. In Eureka township there are several noted mines in full blast, mostly at Moore's Flat. The best paying mine in that township belongs to the Eureka Lake company, though it is reported here that Mr. Blackwell's mine, at Snow Point, is turning out to be a bonanza. R. McMurray is the local Superintendent of the Eureka Lake company's entire works on this ridge. H. C. Perkins, of Malakoff, is the General Superintendent of the entire works of the Milton gold mining company on the ridge, from French Corral to North Bloomfield. At the death of V. O. Bell, Mr. Perkins was selected to fill the place of deceased. Under these Superintendents are foremen. Everything is conducted on systematized principles, every employee having his place, and knowing just what to do. Mining on this ridge is but yet in its infancy, so to speak, for there are thousands of acres of the best mining ground not yet opened up.

**PEARL CON.**—Transcript, Mar. 13: Another shift has been put on at the Pearl Con. claim, on the South Yuba below Kirkham's, and the tunnel will hereafter be run at the rate of 4 or 5 ft a week. The rock continues extremely hard, and some good-looking stringers have been encountered, and the stockholders are anxious to complain at the prospects. Probably within 2 months the main ledge will have been reached and sufficiently prospected to give a pretty fair idea of the value of the property.

**TUR BANNER MINE.**—The incline of the Banner mine is now down 200 ft. A depth of 800 ft will have been reached by April 1st. The character of the ground being well adapted to sinking. At this point the ledge, which now shows over 6 ft of favorable vein matter, will be reached on both north and south. It is anticipated that the very rich pay chute worked to a slight extent by the old Banner company, will be encountered to the south of the incline. As soon as the roads are in a proper condition for crushing the ore now coming from the incline will be hauled to the mill and there crushed. It is expected that the main ledge will be reached and sufficiently prospected to give a pretty fair idea of the value of the property. To be opened again.—The Gold Hill News says of the Centennial gravel gold mining company, which is composed of citizens of Gold Hill and Virginia City, and whose claim is situated in Washington township, Nevada county: They have spent over \$20,000 endeavoring to reach the main ledge, and it passes through their extensive ground—over 300 acres—and at last that they have all the time been drifting and working in the wrong direction entirely. Recent rich gravel developments made in the ground immediately adjoining have proven this theory and shown the proper direction to work, so that now all they have to do is to go in and win. They are making active preparations to do, and have every reason to think they will develop a good paying mine before the end of the present season. Mr. Henry Balch, a member of the company, is Superintendent, and is in charge of the mine. He has been instructed to put on a force of men and actively push the development of the mine to the best advantage possible. Mr. Balch is an old California miner, and was foreman of the Crown Point for some years during its most successful working. He is a

first-class manager, and the company feel that at last they have the man they have long needed, and in the right place. If he commences work in the right place, drifts in the right direction, and hits the big gravel lead in the right place, everything will be all right, especially if he finds plenty of gold.

**MINING LOCALITY LOOKING UP.**—Nevada City Herald, Mar. 10: The locality bounded by the Mt. Auburn mine, Rush creek and the South Yuba, northwest of this city, there are quite a number of prospectors, who all seem confident that they are in a good mining district, notwithstanding that the vicinity previously has had, in mining parlance, a "black eye." Indications at present are that quite a number of cool mines are being prospected, and the coming season will see many prospectors roaming the hills, seeking desirable locations, the advance guard already having gone out. Eastern capitalists have begun to cast their eyes over this range, and rumors are rife that so well pleased were they that several sales are in negotiation. We predict for the future, new life and activity for this heretofore comparatively neglected district.

**THE ADOR MINE.**—This mine, owned by Messrs. John Curry and John Maglia, situated on Miller's ranch, about 3 miles northwest of town, is being developed into a claim of value. A tunnel 150 ft in length was run, and rock encountered that prospects well in free gold. As soon as the roads permit, the owners propose to commence the hauling of milling rock to this city.

**A MISSED SALE.**—The Yellow Diamond mine, in Rocky ravine, about 8 miles northwest of this city, owned by Messrs. Jamieson & Locklin, is about to be sold to New York capitalists. This mine is considered to be a valuable piece of property, and is situated within a short distance of John Curry's ledge, that attracted considerable public attention a short time ago.

**EAST NEW YORK MINE.**—Placer Times, Mar. 12: Monday, March 12, Dr. Nathan and G. B. Chadwick, partners in the ownership of the East New York mine, located on Steep hollow, Nevada county, about 5 miles distant from Dutch Flat, called at the Times office and showed us \$338, the result of 50 carloads of ground taken from the mine while running gangways from the main tunnel, which is run in bedrock with a strip of gravel on the top of from 6 inches to 1 ft in depth. The main tunnel is in 2,200 ft, from which the gangways are being run. This gangway, from which the gold shown up was taken, had been run 100 ft, with a strip of gravel on an average of 1 ft thick and 2 wide. So far, nothing has been done in this mine with the view of taking out gold, only what has been cleaned up from running the tunnel and gangways—a system being laid out for properly opening up the whole claim before any breasting was commenced. Mr. Trathen informs us that in about 6 weeks they will reach the line of the system, and then the work will be done in a gangway, when breasting will be commenced at that line for the purpose of taking out the gold; but only a small space will be taken out, as it is proposed to cut the main tunnel through to the back line of the claim before much work is done, so that breasting can be commenced at the back line and systematically carried forward down the tunnel. In all the different gangways run, the prospects are fine, and it is estimated that at least \$100,000 is now in sight and can be taken out, already opened up for working.

#### PLACER.

**HIERNIA QUARTZ MINE.**—Placer Times, Mar. 10: Sunday, Mr. John McNichols, owner of the Hiernia quartz mine, on the edge of the Swamp Angel, was in town, and from him we learn that he is at work prospecting this claim, and that he has a large body of gravel on the claim is of the usual size, 600 by 1,500 ft, and on the same ledge or ledge upon which the Poole claim is located, on the opposite side of American river. This vein of quartz can be easily traced for miles, commencing on the south side of North Fork of American river and extending across on this side out past the C. P. R. K. He will open up the ledge this summer and make preparations for working it systematically. It is of the same formation and extension of the Poole ledge, and free gold can be easily seen by the naked eye from pieces broken from the rockings on the surface of the ground. The Poole mine has proved itself good, as the little rock that has been crushed has paid all the outlay the company ever have made in developing the ledge.

**BIO BLAST.**—Placer Times, Mar. 10: Last week a blast from the Bio Blast of black powder was fired off in the Brown mine, at Von Bet. A large bank was loosened up by the explosion. Hydraulic washing will be carried on on a large scale in this claim the present season. This mine is a very rich one in gold and a large quantity will be taken out this summer.

**SHADY OLIVE MINE.**—Friday we paid a visit to A. Larson's mine, the Shady Glen, adjoining the town of Alta, and made a thorough inspection of the ground and tunnel now run in the mine. Mr. Larson has a tunnel run into the gravel on the bedrock a distance of 1,100 ft, commencing in the bedrock on the bank of Canyon creek. After a short distance through a rim of bedrock the main gravel formation is met, through which the entire length of the tunnel is cut. This gravel is not cemented and could all be picked without blasting. The gravel is all the finest kind for hydraulic washing, being all quartz gravel without any large boulders. The bank of the tunnel are so soft that the gravel could be picked loose by the hand, but solid enough to stand well without danger of caving. Fine prospects have been made all along the tunnel and some fine specimens of gold been taken out. Mr. Larson will run in still further, as he has not yet reached the main gravel channel, but expects to within a few more hundred feet.

**THE TURKISH SUN MINE.**—Placer Herald, Mar. 12: As soon as the main shaft can be repaired sinking the shaft will be begun and its depth increased about 800 ft, making it 1,200 ft deep. When a depth of 1,200 ft in the shaft is reached drifting will be commenced and the lower part of the mine developed as thoroughly and rapidly as practicable. In a few months from now this mine will be deeper than any other in this part of the State, and its output will be most extensive. Work will be done in the western portion as soon as the drifts can be retimbered, in order to render it safe to work in them. This part of the mine has been unworked for some time, and for several hundred ft down the ground has not been broken. While the main shaft is being repaired the foundation of the mill building will also be repaired, and everything put in first-class order for the inauguration of a new and more extensive mining operation. The mine will accommodate about 50 men will be built on the flat near the mine by the company as soon as arrangements for its construction can be made. About 70 men are now employed by the company, and when all the improvements and developments intended to be made are fully begun, the number will be increased to about 100 men.

**MICHAEL BLANK.**—Cor. Placer Times, Mar. 12: The quartz mine has seized every person in this section. It is quartz for breakfast, quartz for dinner, quartz for supper, and if the excitement still continues, it will be quartz for a tonic, instead of rock and rye. The Daniel Webster mine, a quartz ledge recently discovered, about 11 miles from town, is reported to be very rich. I believe it is the intention of the owners to convey the quartz to the Turkey Hill mill to be crushed.

#### PLUMAS.

**PLUMAS NATIONAL.**—Crescentville Bulletin, Mar. 10: The last reports state that work is progressing steadily, both at the mill and the chlorination works, to the satisfaction of all concerned.

**SOUTHERN EUREKA CON.**—This is in readiness for active work, and the new mill is to be started to-day. Everything is favorable for a steady and uninterrupted run of the stamps.

**GREEN MOUNTAIN.**—The stamps are running uninterruptedly, and the usual activity is manifest in all the details of this well-conducted property.

**ANTELOPE.**—This company has struck a ledge in its tunnel. At last account the shaft had run 5 ft through it and had not reached the foot wall.

**INDIAN VALLEY.**—Last Wednesday evening the tunnel reached the shaft, encountering a large body of very rich ore. Active work is now in progress retimbering the tunnel, laying the track and arranging for the transportation of the ore from the shaft through the tunnel to the mill,

which is ready to start up as soon as ore can be brought to it. The tunnel strikes the shaft 40 ft below the top, and 800 ft above the bottom, and will be able to supply the mill for a long time to come.

**RICH STRIKE.**—Plumas National, Mar. 12: The Southern Eureka M. Co., near Cherokee, struck a ledge a few days ago, 5 ft in width and prospecting splendidly. Indications of a ledge are visible at some distance from the mine, and the efforts which have been made to reach it through the present workings have just succeeded. They start their mill up to-morrow on the new ore, with every indication of success.

**THE JAMISON SHAFT.**—Mr. Thos. W. Jenkin, Sec'y of the City Enterprise M. Co., says that work has just been started up on the shaft again, and this boys think that they will be able to find bottom this time. They are down about 200 ft, and have sent a little over \$40,000 in cash to do that much. The shaft is a large one, 9x14 in size of timbers, and the water is kept down by two pumps, one 10-inch and the other 10-inch, both run by a large overshot wheel. The company is composed of working men, most of them being in the employ of the Plumas Eureka Co.

#### SANTA BARBARA.

**BEACH MINING.**—Gundulone Telegraph, Mar. 10: Mr. Abernethy, Sr., and Wm. St. Ores, went down to their gold mining claim on the beach, last Sunday, but owing to the recent heavy storms at sea, together with the flood tides, they could only work a few hours, but cradled out \$37 in fine dust.

**SABO-NORRIST.**—Redding Independent, Mar. 10: Although the cold of the 9th has departed, Sabasta county still contains a few lumps. This time Thomas Harrison, owner of a placer mine at Quartz hill, is the lucky man. While panning one day last week, he uncovered a chunk valued at about \$200.

#### NEVADA.

##### WASHOE DISTRICT.

**CALEDONIA.**—Cold Hill News, Mar. 14: Pumps have been run an average of 15 hours per day, burning an average of 6.27 cords of wood per day; pumping about \$3 inches for Belcher company. At Forman shaft have extended Suro tunnel drifts 6 ft and dropped it for the present; total length, 122 ft. Have put in plunger pump and balance-bobs at 1700 station; also 600 ft of compressed air pipe.

**SIERRA NEVADA.**—The northwest drift from the south slopes in the ore body (2500 level) is 40 ft in length. Amount of ore raised during the week, 8101 tons.

**CON. VIRGINIA.**—During the past week 310 tons of ore, assaying \$36.65, were extracted on the 1650 level and sent to the mills.

**OVERMAN.**—North drift, 2275 level, has been extended 50 ft; total length 106 ft. At the Forman shaft have put in pump and balance-bobs at 1700 station, and 600 ft of compressed air pipe, and will start pumps to-night and resume sinking to-morrow.

**HALE & NORRIST.**—The compressor and blower pipes are being taken out from the 1st to the 8th station, and new pipes will be put in place by the 13th inst., and work under ground resumed.

**ALTA.**—During the past week have sunk and timbered the shaft 35 ft; total depth, 1,925 ft.

**SILVER HILL.**—Everything is so far advanced that we will not be obliged to crowd anything to be ready to open the corresponding level as soon as Alta taps the water on their 2050 level.

**BELCHER.**—Pump running at 61 strokes is bolding the water below the 2160 level. All machinery is in good order.

**CALIFORNIA.**—During the past week 310 tons of ore, of the assay value of \$40.05 per ton, were extracted from the 1050 level.

**UTAH.**—During the past week the east drift on the 2150 level has been advanced 21 ft. The main incline has been sunk and timbered 15 ft.

**C. & C. SHAFT.**—The shaft has been sunk 6 ft during the week; total depth below the 2500 level, 24 ft.

**G. & C. B. & D. SHAFT.**—Making good headway with bolts No. 3 and No. 5 is completed. The bolts for 5 stations have been received from the foundry.

**UNION CON.**—On the 2500 level the joint Mexican east crosscut has been extended 27 ft, and we are cutting out a chamber for a winze in the joint Sierra Nevada east crosscut.

**UNION SHAFT.**—The shaft is being repaired at the 1000, 2200 and 2500 stations.

#### CANDELARIA DISTRICT.

**NORTHERN BELLE.**—True Effusion, Mar. 12: Since last week a crosscut has been started in a northwesterly direction from the main drift of the 4th level, which has been extended 15 ft, and is now in favorable looking ground. Other shaft levels show no material changes, but look as well as a week ago. The ledge above the adit are looking well throughout, keeping up their usual yield, and promising finely for the future. An average output of 88 tons of ore is being extracted daily and sent to the mills. The shipments of bullion on the March account up to the 9th inst., aggregate \$24,246.80.

**MOUNT DIABLO.**—The winze from the 2d level is nearly connected with the upraise from the 3d, and has been driven 12 ft. The ledge above the level is still following a ledge of fine-grade black ore and has been worked 14 ft. A winze has been started from the foot of the Callison winze on the 2d level, and is being driven toward the 3d.

#### ESMERALDA DISTRICT.

**FAVORABLE INDICATIONS.**—Esmeralda Herald, Mar. 12: I. E. James, Supt. of the Sierra Nevada mine, and one of the most thorough miners of the Pacific coast, spent Thursday examining mines in our district. He informed a Herald representative that so far as he could judge from his hurried examination, Aurora had the most favorable indications for large and rich bodies of ore of any camp on the coast, and it was his firm belief that as soon as the C. & C. R. reached Hawthorne, men of capital would come in. With a mill to crush even what was in sight, a few months would witness the shipment of large quantities of bullion.

**THE NEW ESMERALDA CON. CO.** are pushing the work of prospecting as rapidly as possible, and they say the more work they do the more they think of their property.

**EVA CON.**—The contractors on this mine are storing away the dump a large amount of ore.

**THE DEL MONTE.**—For the past two weeks the water has so bothered the superintendent and machinery, that nothing has been done in the mine save pumping and tanking. The new Esmeralda Con. Co. are pushing the work of prospecting as rapidly as possible, and they say the more work they do the more they think of their property.

**HUMBOLDT WEST.**—The Humboldt West ledge looks very promising, and the ore is a little different from anything in this camp. From wall to wall the rock is the same, some of it very high grade ore, while the whole vein will pay a very high price for milling.

**GRANTSVILLE DISTRICT.**—Alexander, Grantsville Bonanza, Mar. 10: The Alexander mine still opens better and better with every shot, and in the great stopes can be seen ore enough to run many stamps indefinitely. A large body of improved pattern arrived last night for the hoisting works. The incline is still being pushed rapidly downward, showing as well as ever.

**BROOKLYN.**—The Brooklyn shows no signs of letting up, but continues to furnish high-grade ore for 20 stamps, the stopes still showing up splendidly. The incline goes

down at a rapid rate, and soon another level will be ready for prospecting and stoping.

**DOWNEYVILLE.**—The new shaft of this Downeyville company is down 40 ft, and is being pushed as rapidly as possible. Heavier hoisting machinery has been ordered, and there will be no lack of capital to send things along at a lively rate. When the Carson & Colorado railroad is completed to Hawthorn, Downeyville will be within 40 miles of that place.

#### TYBO DISTRICT.

**SALZ.**—Cor. Eureka Sentinel, Mar. 13: It is rumored here that Mr. English has sold the Tybo Co. company's property to Eastern capitalists. If this be true, I hope the new company may give as entire satisfaction as the former owners. The property is second to none in the State, if the Richmond and Eureka Co. companies be excepted, and when the Two C mine attains the depth of the mines belonging to the above-mentioned companies, it will compete favorably with them for the laurels of being the gem of the Pacific coast.

There are a number of other promising claims in this district, among which are the Pace & Dunt, the Bod rock, with a 3-ft ledge of calena, the Luce & Dimick and the Independence, which has a well-defined ledge of high-grade ore.

Reports come from Florence district that the mines are looking well. All they desire now is to have a mill erected in the immediate vicinity to work their ore. Downeyville has been very dull here since the Tybo Con. closed down their works.

#### ARIZONA.

**SILVER BELLE.**—Arizona Mining Journal, Mar. 12: The unanimity of sentiment disclosed with reference to the new Silver Bell district is very encouraging. Now that Tombstone has been segregated from Pima county, it is of importance that our city should have some district to take its place as an ore producing center. The Silver Bell we have all the requisites. Ore has been found of the same character, surpassingly rich in metals, easily worked, advantageously located, and within a short distance of the railroad. Indeed, the similarities between the Tombstone district and the new bonanza are so striking as to demand special notice.

Just as Bisbee complements the silver workings of the Tombstone district, so do the wonderful copper ores in the vicinity of Picher supplement the splendid silver prospects in the Silver Bell.

**COAL.**—Cor. Tucson Citizen, Mar. 12: On a trip in the interest of the projected A. M. B. R. R., along its proposed route, I visited the immense coal field south of Oila river, and found it has already been traced from 20 to 30 miles in length and some 3 or 4 in width, though the same surface indications extend for very much more, and will doubtless be 10 miles wide. Veins show from 5 ft to 100 ft thick, and the coal increases in quality on going down, and from present developments the veins are but a short distance from each other.

**SILVER DISTRICT.**—Cor. Tombstone Expositor, Mar. 11: Thomas Hughes has sold his group, consisting of the Black Rock, Pacific and Blue Rock mines, for \$175,000; \$1,400 cash, the remainder to be paid April 1, 1881. Franklin J. Clark, of Tombstone, represents the purchasers. Assays from the vertical main working shaft, on the Silent, 184 ounces of silver to the ton, average; considerable metal is being sacked as they sink that will assay from 5,000 to 6,000 ounces to the ton, silver.

**VULTURE.**—Cor. Phoenix Herald, Mar. 12: The principal owner of the Vulture mine and mill, Mr. Seymour, on a visit here before he returned to the end of February's close-up. It was the best clean-up since the mill started, and I learn from good authority that the 14 days' pounding netted \$25,000. Take into consideration that amount taken out every two weeks, and then take an estimate of the amount paid to the very few hands employed all over the concern, and at a lower rate of wages than in any kindred institution in Arizona; it is not to be wondered at that it is a paying mine.

#### IDAHO.

**GALENA MINES.**—Yankee Fork Herald, Mar. 11: There are several galena mines about 5 miles above Challis, on Oarden creek, and near Challis' old saw mill. The Pinto and two others are owned by Fred Winterhoff, Charles Lichtenfeld and Fred Sperling. There is quite a lot of iron ore in the dump that will go for 50 or 60 ounces per ton. There is plenty of wood and timber handy, and if the mines prove good, which it is thought they will, they can be very profitably worked. They are situated in a country where there is no snow, and the work can be prosecuted as well in winter as in summer. We expect to see smelters running there in the near future.

**WOOD RIVER.**—Cor. Salt Lake Tribune, Mar. 11: The long expected boom will commence inside of the next two months. At present we are receiving many letters from all parts of the coast, from those who left here last fall to escape our winter. The country is as yet poorly prospected, but will give thousands a chance to show their ability as prospector and miner. The promise of Wood river gives everyone here a hope such as has never been since the discovery of gold in California. Thousands were produced here in 1880, but no product will be in 1881 no person can tell; all expect millions. The history of this new mining region has been one in which the general public has taken an unusual amount of interest, owing to the richness and the vast territory it embraces. This country is a poor man's country if ever there was such a one. The richness of our ores justifies their shipment to foreign markets, and leave a handsome profit to the miner. As has been said, the country is rich in ore shipments to Salt Lake, which has proven a good market for our mines. The business men are busily engaged in improving the looks of their various houses. The newspapers to be located here have created quite a sensation. All the people of Wood river are jubilant over the news. At Ketchum two shingle factories are busy at work this winter. Three blacksmith shops are located there. New strikes are reported in Calumet and Saw Tooth cities.

#### MONTANA.

**ALTA MONTANA.**—Helena Independent, Mar. 10: The mine is still having trouble to get enough wood to the works to keep all departments running, but the sneller is kept going on Alta ore, fluxed with the iron ore taken from the main ledge discovered by the works. Car lot of \$25,000, weighed up last Monday, is found to be very rich, carrying in the aggregate \$3,804.14. The ore of the Alta shows some gold, and the car lot had over \$120, besides the silver.

The Albion has made an excellent record for itself, and promises to continue to produce for its owners satisfactory results. At a depth of 50 ft a level was run about 130 ft, and all the ore taken out, amounting to 353 tons, without assorting, was milled. It produced \$1,007.17, or an average per ton for the ore worked of \$30.28. The vein worked from 6 to 11 ft in width, or an average of about 9 ft.

We learn that Prof. Hesse, now in Helena, will make a somewhat particular examination of what is known as the Ten Mile district, with the view to locating a developer at some advantageous point. It is not improbable that Buffalo gulch may be selected, as there is an abundance of wood and water in that vicinity.

The Original M. Co., of Butte, will start up work soon under the same management as the Boston & Montana G. M. Co., and the Gregory Con.

**HELENA'S FEEDERS.**—The Helena assay office yesterday received 3,000 ounces in gold and silver retort from the mill of Thomas Cruise, and 600 ounces of gold retort from various other parties, all within a radius of 25 miles of Helena. Such receipts at the assay office are now of constant occurrence.

**FROM PHILIPSBURG.**—New Northwest, Mar. 11: James Milligan was in from Philipsburg on Monday and reports the place tolerably quiet. The ore to be located is developed 2 or 3 leads. The shaft at the Cliff ledge is over 170 ft in depth. The work of sinking is being continued. Two levels are being run at 100 ft. The Algonquin hoisting works are in place and doing good work. The company are working principally on the Algonquin ledge. The water comes in very fast, and unless the flow ceases it will necessitate the getting of larger pumps than those now in use.



### Head of the Female Fur Seal.

We give on this page a side view of the head of the female fur seal, taken from the handsome work, "The Marine Mammals of the North-western Coast of North America," by Capt. Chas. M. Scammon. This book treats of the ocean mammals scientifically and commercially, and is a valuable addition to the library. The author says the fur seals have so wide a geographical range—extending nearly to the highest navigable latitudes in the northern and southern hemispheres—and are found assembled in such countless numbers at their favorite resorts, that they become at once a source of great commercial wealth; and among marine mammals they are the most interesting we have met with. The color of the full-grown males is dark brown, with scattering hairs of white about the head, neck and anterior portion of the body, and, in some instances, nearly approaches to black. At a distance, it is difficult to distinguish between an old male seal and a full-grown male sea lion of the California coast, the former being frequently found measuring 9 ft. from tip of nose to extremity of posterior flippers.

The females average fully one-half of the length of the largest males, and the greater

limbs are shaped much like the fins of the smaller cetaceans; the posterior ones have five distinct toes or digits, and three nails or claws project from their upper sides four or more inches from their hips, according to the size and age of the animal. The tail is extremely short and pointed. The ears are pointed also, slanting backward, and are covered with short, fine hair. The eyes are invariably dark and glistening, and have a human-like expression.

The intrinsic value of the animal does not depend upon the price of its skin alone; for the layer of fat adhering to it yields the oil of commerce and supplies light and heat to the natives in their dismal winter quarters. The flesh, likewise, afford them a staple article of food.

### Heat in Mines.

An opinion has long prevailed on the part of many persons that the extreme heat in the lower levels of the Comstock mines of Nevada is solely due to their great depth. It is an established fact that the heat existing there is so great in places that the miners can only work ten and fifteen minute shifts, and then in a state of comparative nudity. A scientist, who has given a great deal of thought to the subject, claims from the deductions he has made, that this heat alone is the result of chemical action, such as the presence of limestone, which de-

composes the decomposition of iron pyrites—masses of iron and sulphur. At Steamboat springs and other places in this State, and at other places in California, the heat is produced by the burning out or decomposition of iron pyrites. At Steamboat springs the course of the deposit of iron pyrites is northeast and southwest, the same as that of the great mineral-bearing veins of the State. The line of active springs follows the course of this deposit, moving toward the northeast. At the southwest end are to be seen places where the deposit of iron pyrites and similar minerals carrying large quantities of sulphur has burned out and the springs have died away. The process of burning out is slowly moving toward the northeast. In 1860 the writer saw a new spring just starting up through a thick growth of grass in a bit of meadow land far in advance of the older and larger ones, but on the same general line, well out to the northeast.

The base-metal deposit at Steamboat springs also has the same dip as the Comstock, and is working east as well as toward the north. By going from half to three-quarters of a mile west of the present active springs at Steamboat one may see where the springs were ages ago, along near the croppings or upper edge of the deposit of pyritic matter. As the decomposition proceeded downward and eastward along the dip of the deposit, the steam and hot water found or forced new vertical channels of escape. Some

### Manzanita Mine.

What is being Done at one of Nevada City's Big Hydraulic Claims.

Under Orrin Gowell's superintendence, operations at the Manzanita hydraulic claim in the northern edge of the city, are progressing favorably. This season's run has already extended over 65 days, and as there is some 20 ft. of hard snow in the Meadow Lake region, it is probable that that work can be continued till July. The company's new ditch, 7½ miles long and having a capacity of 1,500 inches, cost in its construction \$15,000. Only a thousand inches of water is running now. When necessary, an additional supply can be purchased from the Yuba Canal company. Sufficient fall can be obtained to work the entire claim, embracing 450 acres, only a small portion of which has been exhausted as yet. The pipe-clay is growing less daily, and an increased amount of good gravel is making in. The bank in some places is 200 ft. high, in others coming down to an inconsiderable height. Numerous seams of very rich gravel are now seen in it. Heavy caves frequently occur, but they accelerate rather than retard the working of the claim. When the last cave is worked off, or shortly after, the fabulously rich ground which comprised the old Live Oak drift diggings will be entered, when still larger profits than now are expected.



HEAD OF A FEMALE FUR SEAL (*Callorhinus urelinus*)— TWO-THIRDS OF NATURAL SIZE.

portion of them are of a silver-gray color; the very oldest, however, are dark brown on the back and sides, with scattering white hairs over all. The fur is reddish brown on the inside. The thick mixture of black, glistening hairs imparts the dark hue to the oldest animals, and the white hairs on the younger ones give them the silvery luster. Both old and young are of a lighter shade underneath, particularly about the pectorals and posterior portions of the body. The layer of fat, or blubber, between the skin and flesh may average 1½ inches in thickness, varying according to the time the animal has been on shore—it being very fat when the season begins, and very lean when the season is over, which changes the animal's appearance considerably from its former robust condition. When in full flesh the adult females weigh about 85 lbs.

The engraving affords a good idea of the outline of the head (side view), and the expression of the harmless mother, who bears her offspring and submits to the harsh treatment of her male companion and master, without manifest complaint or resistance.

The female rarely produces more than a single offspring. The pups when born are about one-third the length of the mother. They are covered with a thick mat of coarse fur, which changes to a finer texture and slighter shade as the animals mature. The time of bringing forth young on the coast of California is from May to August, including parts of both months.

The flippers of the fur seal are destitute of hair, being covered with tough, black skin, similar to shagreen, which is very flexible about the terminations of their extremities. The side

composes rapidly when attacked by carbonic acid gas and the action of water, qualities which are ever present in the mines. The decomposition causes the generation and exudation of intense heat, which, being largely confined in circumscribed space, greatly affects the comfort and convenience of the delvers of the deep while they are engaged in dislodging the argentiferous ores. The hot springs in Colorado and other States acquire their heat through similar action, and not by reason of depth, and this theory goes far toward substantiating the theory advanced. Mines of greater depth have been worked in Europe without the inconvenience of such heat being experienced, and indications exist that the mines in Old Mexico have been worked much lower down than those on the Comstock lode.

The above item is from the New York *Mining News*, and the Virginia *Enterprise* adds the following:

Lime is undoubtedly one cause of heat in our mines, but it is not the only nor the great heat producer. Lime is local in its action, the heat produced by it is confined to certain sections of the mines, while underlying the whole length of the Comstock lode is that which causes the general heat, namely, the deposits of iron pyrites.

The hottest places in the mines are where the heat is generated by both lime and pyrites; it is the heat from the lime added to the heat from Nature's workshop below.

The hot springs of Colorado may derive a portion of their heat from the decomposition of lime, but this is but a secondary cause. The great and first cause of heat in springs an-

of these openings are probably natural crevices, but the majority are undoubtedly rents produced by the force of steam and pent up gases. Even on the surface at Steamboat springs are to be seen long rents from an inch or two to over a foot in width that have a northeast and southwest course. In California some of the hot springs are observed to be dying out at one end of their line and advancing into new ground at the other.

At Steamboat springs we probably see a big mineral vein (like the Comstock) in process of formation. Ages ago there was probably a line of hot springs along the course of the Comstock. The mines of Europe and Mexico which are comparatively cold at great depths are undoubtedly age and ages older than the Comstock.

The Comstock is probably the youngest mine in any part of the world that is now known or being worked. Here, down in our lower levels, we are following close upon the heels of nature—getting well down into her workshop.

As to the heat-generating power of sulphur and iron, those who desire to do so may satisfy themselves. Take a few pounds of iron filings, borings and drillings from a machine shop, wet them and mix in a pound or two of sulphur, then tamp the mixture firmly into a hole in the ground—like a post-hole—covering with two or three inches of dirt, and in a short time there will be seen a miniature volcano, the batch of iron and sulphur taking fire spontaneously.

ORE assaying \$44 per ton was raised from the California mine this week.

It must be remembered that much of the ground belonging to the Manzanita bas, in years gone by, been dined by different parties, but by that process only an insignificant portion of the channel could be extracted. The present owners have expended in the neighborhood of \$150,000 on the ground within a couple of years. They expect to clean up as much as \$100,000 for this season's run, and that it will take them 30 years, more or less, to exhaust the deposit at the present rate of working, the profits increasing as they advance into the hill. Only two monitors are washing at present, and the visitor in vain looks around on the large force of employees for a heathen Chinese.—*Transcript*.

**HORN SILVER MINE.**—We learn from J. C. Lynch that there is not any truth in the report that has gone abroad to the effect that the old owners of the Horn Silver are about to repurchase the mine. The company is now very busily engaged arranging affairs to work the mine on a much larger scale. They are experimenting with a new process for working their ore, and should it prove successful, the company will be enabled to work its ore without calcining it. It now, by the present method, costs the company \$28 per ton to reduce its ore, but if the new method is a success, it will cost but \$13 per ton, which is an immense saving, and the company will then be able to thrive its working force. The three etacks at Frisco are running under full headway, and work is being vigorously prosecuted on the new furnaces now in course of erection near Salt Lake City. The outlook of Frisco is very bright, for there are several companies now operating there.—*Pioche Record*.



## THE ENGINEER.

**THE GREAT BRIDGE AT ST. LOUIS.**—A few years ago, in anti-bridge days, passengers were ferried across the Mississippi and landed on the crowded levees, at great inconvenience. But now, thanks to a great architect and mechanical skill, the tired traveler sits in his comfortable car until it reaches the depot in the heart of the city. The upper Mississippi has been spanned by 12 great railroad bridges, costing in the aggregate over \$20,000,000, and this one at St. Louis has cost as much as all the other 11 combined. This magnificent structure is a monument to the engineering skill of Capt. James B. Eads. How can we describe it? Four massive piers of granite reach down to a rock foundation, more than 100 ft. below the surface of the river, and rise 80 ft. above the water. These stupendous piers support three immense arches, each one 500 ft. long. The arches are composed of chrome steel tubes united by a vast network of iron braces. The bridge has two divisions, the upper portion being used for carriages, horse-car tracks and promenades. Through the lower division runs a double line of steam railway tracks, on which 100 daily trains go thundering back and forth. Leaving the bridge the trains plunge into a tunnel as dark as mid-night, and nearly a mile in length, passing under the city to the great Union depot. As trains now meet at this great central station, and twice a day, it is probably the busiest place to be found in the country; morning and evening one can see no less than a dozen trains standing there ready to depart to all points of the compass.—*St. Louis Times.*

**IMPROVEMENT IN ORDNANCE.**—In the matter of building large ships, and casting heavy guns, the American people have not kept pace with Europeans. The heaviest American-built ships are floating shells compared to the massive iron vessels England, France, Italy and other European powers have constructed; and the largest guns on American ships or seaboard defenses bear no comparison in the weight of missile thrown by the guns which are floated on European navies. It is now intimated that the discovery of what is termed a new system of ordnance, by an American, will do away with the improved cannon, which have been brought to their present state at such enormous cost. Late Eastern papers give long accounts of recent ordnance experiments in Washington, in which the new invention was tested. These experiments are reported as highly satisfactory, but still showing that the plans of the inventor are not yet perfect, or, rather, that they have been imperfectly carried into practice. The purpose of the inventor is to make war so destructive that, by common consent, it will be abandoned as a means of settling international difficulties.

**THE GRAND CANAL OF CHINA.**—This canal is likely to share the fate of the great wall. This water-way was constructed by Kublai-Khan and his successors of the Yuen race, and is 600 miles in length. There are 10,000 flat-bottomed boats on this canal, and these are used in the transportation of grain. The *Echo* states that this great water-way is an enormous "white elephant," as it costs an enormous amount every year for repairs, the appropriations there, as elsewhere, not being entirely devoted to the purpose for which they are meant. Junks are delayed every month while channels are cut for their passage. This year, for the first time since the construction of the canal, the grain from Nanking, with the consent of the government, has been forwarded by sea, and this fact has impelled the Peking authorities to consider the expediency of abandoning the canal as a commercial highway.

**THE CHANNEL TUNNEL.**—It is asserted that within 18 months two and a half miles of the proposed channel tunnel between England and France will have been excavated, and that the work will be completed in about four years. Still another grand scheme, however, for crossing the channel is contemplated, namely, a line of steel tubes, 16 ft. in diameter, ballasted so as to make it weigh one and one-fourth tons to the foot less than the water displaced, and held at a depth of 35 ft. below the surface, so as not to impede navigation, by chains attached to caissons sunk to the bottom.

**A HIGH BRIDGE.**—A bridge has recently been built over the Volga, in Russia, at a point where it is a mile in width. So great are the spring floods at that point, that the bridge has been built 100 ft. above the lowest level of the water; the depth of the river is more than 50 ft. The bridge rests on 14 piers. The girders are 364 ft. long and 20 wide, and were riveted together on the bank of the river.

**WHEAT SHIPMENTS VIA HUDSON'S BAY.**—Prof. Bell, who has lately returned from England, is gathering information in behalf of the Government to determine the feasibility of opening a route through Hudson bay, for the transportation of grain from the Northwest. It is claimed that grain can be laid down in Liverpool cheaper by the proposed route than by the all-rail route, the Canada Pacific railroad.

**RAILROAD CONSTRUCTION FOR 1880.**—The *Railroad Gazette* gives the amount of railroad construction in the United States for 1880 as 7,401 miles. The total mileage on Jan. 1, 1881, is set down as 93,898 miles.

## USEFUL INFORMATION.

## How to Coat Articles with Lead.

Professor Emerson Reynolds thus describes one of the best methods of applying his new process of galsuizing, or covering with lead various substances: Take 16 grammes of solid sodic hydrate (NaOH) or an equivalent of other suitable hydrate, dissolve it in 1.75 liters of water, and add to the liquid 17 grammes of lead nitrate (Pb2NO3), or an equivalent of other lead salt, with 250 cubic centimeters of water; raise the temperature of the mixture to 90° C. If sufficient lead salt has been added the liquid will remain somewhat turbid after heating, and must then be rapidly strained or filtered through asbestos, glass-wool, or other suitable material, into a convenient vessel. The filtered liquid is then well mixed with 100 cubic centimeters of hot water containing in solution four grammes of sulpho-urea or thiocarbamide. If the temperature of this mixture be maintained at about 70° C., deposition of galena in the form of a fine adherent film or layer quickly takes place on any object immersed in or covered with the liquid, provided the object be in a perfectly clean condition and suitable for the purpose. When the operation is properly conducted a layer of galena is obtained, which is so strongly adherent that it can be easily polished by means of the usual leather polisher. It is not necessary to deposit the galena from hot liquids, but the deposit iron is more rapid than from cold solutions.

The most convenient solution for deposition on brass is thus prepared: Take a quantity of soda lye containing 1½ ounces of real soda (NaOH); dissolve this, with the aid of heat, three ounces of tartaric acid, and just before diluting the solution to one gallon of cold water, add five drachms of sulpho-urea previously dissolved in a small quantity of hot water. The articles are to be immediately immersed in this bath, and the temperature raised to boiling. When the desired tint is obtained the articles are to be removed, washed and polished. The above solution can be used for glass or porcelain, hot or cold, if the proportion of alkali be reduced one-third or thereabouts.

**COPYING DRAWINGS.**—By a method patented by M. Joltrain, of Paris, it is claimed that copies of drawings having nearly black strokes on a white ground can be made by the following sensitizing mixture: Gum, 25 grammes; chloride of sodium, three grammes; perchloride of iron at 55° B., 10 cubic centimeters; sulphate of peroxide of iron, five grammes; tartaric acid, four grammes; water to fill up to 100 cubic centimeters. The developing bath may be a solution of ferrocyanide of potassium, red or yellow, acid or alkaline. The printing is done in the ordinary way, and the developing in a bath of red or yellow prussiate of potash. After washing the proof is put into an acidulated bath, which darkens the lines to an indigo tint, and is then again washed and dried.

**CLEANING WATER PIPES.**—A correspondent of the *Forest and Stream* gives a novel method employed to cleanse a two-inch water pipe which had become choked with mud. A string was tied into a hole punched in the tail of a small eel, which was straightway put into the pipe. An occasional jerk reminded the eel that it was incumbent on him to proceed, which he did, arriving at the lower end of the pipe with the string. A bunch of rags was tied to the string, and thus the pipe was cleansed.—*Locomotive.*

**FURNITURE POLISH.**—For a polish to clean up and brighten old furniture, pianos, etc., dissolve four ounces of orange shellac in one quart of 95-cent alcohol; to this add one quart of linseed oil and one pint of turpentine; when mixed add four ounces of sulphuric ether and four ounces of aqua ammonia; mix thoroughly before using. Apply with a cloth or sponge, and rub the surface to which it is applied until the polish appears.

A new leaden roof is being placed on the cupola of St. Peter's, Rome, which it will take two years to complete. Something of the magnitude of the building may be inferred from the fact that the roof was begun 17 years ago, and although the laborers have not been constantly at work, the work is enormous. The roof is divided into 16 sections, each of which requires 1,000,000 lbs. of lead.

**AMERICAN LEATHER IN ENGLAND.**—After having exported American beef, shoe leather has seemed to obtain a solid footing among English shoemakers, both on account of its cheapness and durability. 9,500,000 lbs. have been exported to England from the United States for the first six months of the last year, from January to July. The value of this is nearly £400,000.

**CELLULOSE IN A NEW ROLE.**—It is reported that celluloid has of late been successfully applied in the form of a veneer in the ornamentation of furniture. It is used in this way in imitation of malachite, or colored marbles, for table tops, and for panels in imitating tortoise-shell and other costly materials.

ONE gallon of neat's-foot oil mixed with four ounces of lampblack makes a good harness oil.

**COLORING GLASS.**—Oxide of gold is employed to impart to glass a beautiful ruby color. Suboxide of copper gives a red color. Silver, in all states of oxidation, gives a variety of beautiful yellow and orange colors of glass. Antimony, lead and silver, in combination, are employed to produce the inferior yellow color. The oxides of iron give to glass various shades of green, yellow, red and black. Oxide of chromium gives a fine green, the oxide of cobalt a splendid blue. The color most valued, next to that produced by gold, is the yellow communicated by oxide of uranium, and which has an appearance resembling shot silk. White glass or enamel is made by adding either arsenic or the oxide of tin to the melted metal. The various metals used in coloring glass are also employed in the manufacture of artificial gems, and by their means the color and general appearance are well imitated.

**ENCROACHMENTS OF GREAT RIVERS.**—The extent of the encroachments of rivers like the Mississippi and Missouri upon their banks can only be compared with what is taking place upon the south-eastern shores of Great Britain by the action of marine currents. Indeed, owing to the direct manner in which American rivers impinge upon their banks in certain parts, the destructive action is, in this case, still more rapid. Several thriving towns on the banks of the two rivers specified have within the last few years been swept away by the erosion of their banks.

**USEFUL HORNETS.**—Most persons may not be aware of the fact that there is an old-standing feud between the hornet and fly families. A farmer who was acquainted with this fact recently hung up in his parlor a hornet's nest which he found in the woods, and in a short time the house was thoroughly cleared of flies. Is not the remedy worse than the disease?

**CONVENIENT FOR TRAVELERS.**—An invention has been made in Hartford for announcing the stations on railroad trains, which can be worked by steam from the engine or by electricity, and a company has been formed, with a capital of \$100,000, to manufacture it, with W. H. Goodrich, of the Hartford *Courant*, as president.

**HOW TO SOFTEN RESIN.**—Melt the resin, and while in a state of fusion add tar. The proper degree of hardness can be ascertained by dropping a small portion of the melted mass into water.

## GOOD HEALTH.

## Oxygen as a Curative Agent.

Is oxygen a curative agent? The wonderful power which it possesses of destroying organic matter, and the purifying effect which always results therefrom, has led us, reasoning by analogy, to believe that many diseases which are now regarded as incurable, would succumb to the cleansing power of this element. The air contains only 20.95% of oxygen, the remaining 79.05 parts being composed entirely of nitrogen, which serves to dilute the oxygen. The depressing effect of a smaller amount of oxygen and increased amount of carbonic acid is felt when one has been for a short time in a poorly ventilated room.

In mountainous countries, where the height above the sea level is not too great, the refreshing effect of the air is proverbial. This is simply because the proportion of oxygen is greater and of carbonic acid less.

The purifying effect of oxidation is strikingly shown in running brooks. Here water which is unfit to drink on account of organic impurities, becomes pure by running a mile or two. This change is due to the fact that in the act of flowing each particle of the water is brought into contact with the air, and absorbs the necessary amount of oxygen to combine with the organic matter, thus destroying it.

In many diseases a "change of air" is recommended as a cure, or at least as a source of relief. In its incipient stages consumption may often be cured by vigorous exercise in the open air, and by living wholly out of doors.

The benefit derived from pure air and exercise is due entirely to the large amount of oxygen which exercise—such as horseback riding—enables and compels the patient to inhale. The organic germs of disease are thus oxidized and destroyed.

We submit, then, to the public for consideration, the question: Will not the breathing of pure oxygen gas prove to be the solution to the problem, "How shall we treat consumption?" There is a well authenticated case in which a child was cured of hydrophobia by inhaling three cubic ft. of oxygen. In this case blood poisoning was the evil, and oxygen seems to have combined with the poisonous principle, thereby destroying it.

A young Frenchman who has recently been experimenting upon himself, finds that he can inhale oxygen without experiencing any ill effects. He took as much as 100 liters a day for several days. The writer has often inhaled oxygen for experimental purposes, and its use was never followed by any unpleasant effect.—*Hall's Journal of Health.*

THE TERRIBLE CRAMP COLIC, so often fatal before the dawn, can often be relieved within an hour with a milk emetic, and flannels, wrung in boiling water, applied to the stomach.

**MEDICAL USES OF EGGS.**—For burns or scalds, nothing is more soothing than the whites of an egg, which may be poured over the wound. It is softer, as a varnish for a burn, than collodion, and being always at hand can be applied immediately. It is also more cooling than the "sweet oil and cotton," which was formerly supposed to be the eures application to allay the smarting pain. It is the contact with the air which gives the extreme discomfort experienced from ordinary accidents of this kind; and anything which excludes air and prevents inflammation is the thing to be at once applied. The egg is also considered one of the best remedies for dysentery. Beaten up slightly with or without sugar and swallowed, it tends by its emollient qualities to lessen the inflammation of the stomach and intestines, and by forming a transient coating on those organs to enable nature to resume her healthful way over the diseased body. Two or at most three eggs per day would be all that is required in ordinary cases; and since the egg is not merely medicine, but food as well, the lighter the diet otherwise, the quicker the patient is kept, the more certain and rapid is the recovery.

**NEW TREATMENT FOR SCARLET FEVER.**—A very interesting experiment was tried by Dr. Ashby, medical officer of health for Grantham (England), in dealing with an outbreak of scarlet fever in that town during the summer of 1878, by means of isolating the patients in tents. He prevailed upon the local authorities to erect a tent hospital on the outskirts of the town, and induced parents to send their sick there. The result was most successful. Parents availed themselves of the tents largely (their early prejudice against them being readily overcome), the patients did remarkably well, and the spread of the disease was unquestionably much curtailed. Altogether the example set was one which deserves to be copied, and shows with what readiness the spreading diseases of children may be dealt with by the exercise of energy and forethought.—*Lancet.*

THE STING OF A WASE, or bee, or yellow-jacket has often proved fatal in five minutes, when the prompt application of hartshorn to the wound, and a few drops swallowed with water, would have antagonized the poison and saved the life; but in a dozen houses in the country there might not be found a drop. It may be useful to know that a bit of soap or a handful of wood ashes stirred in a glass of water, makes a good hartshorn substitute in half a minute; or, if there be not a wood fire in a mile, a handful of moist earth grabbed from the first mud-puddle, or pond, or brooklet's edge, contains hartshorn and other curative elements, which, if applied in the shape of a poultice, gives instant relief to the sufferer.—*Dr. Hall.*

**THE WAY TO REST.**—To understand this is of more importance than to know how to work. The latter can be learned easily; the former it takes years to learn, and some people never learn the art of resting. It is simply a change of scenes and activities. Lazing may not be resting. Sitting down for days with nothing to do, is not restful. A change is needed to bring into play a different set of faculties and turn the life into a new channel. The man who works hard finds his best rest in playing hard. The man who is burdened with care finds relief in something that is active, yet free from responsibility. Above all, keep good natured and don't abuse your best friend, the stomach.—*Sol.*

**THE CROUP.**—Toward midnight, after the first sleep, the hateful croup usually fixes its dreadful fangs on the unconscious child. What averts it in the country, miles away from a physician or a drug store, that this, that, or the other remedy is "good for" the disease, when neither physician nor remedy could be had for hours; and all this while the mother is in agony, and the infant sufferer clutches its throat for breath? In such an emergency no medicine known is so potent for cure as a hoiling teakettle and a bit of flannel; or, as a lump of ice or snow, with a handful of salt, applied to the throat in a silken pad or bag.—*Dr. Hall.*

**WAR ON THE POTATO.**—Dr. Heath, a scientist of New York, has ventured upon dangerous ground. He read a paper before the Farmer's Club, in which he opened a war against the time-honored potato. It is an agent, he says, in producing obesity. Many lean persons will be glad to learn that they will double on the potato ratio at once. "Ah, hut," says Dr. Heath, "the potato makes the wits fat, also;" and further, "after the lapse of a few generations it dwarfs, mentally and physically the people who live upon it." As in the admixture of food, the potato has not been proved dangerous during several centuries, we think people will be willing to trust it in the future.

**AN OLD IDEA UNDER NEW CONDITIONS.**—Attempts have been made to propel boats on canals and rivers by conducting a column of water through a pipe and rejecting it forcibly at the stern, but they did not prove successful. An Englishman now claims to have got over the difficulty by showing "the force exerted by one fluid pouring into or against another depends on the contact of surfaces, and not on the sectional area of the flowing mass, after it has once set in motion." Instead, therefore, of tubes with large orifice, he makes use of tubes with narrow outlet, a mere slit, and thus obtains a large superficial contact by ejecting water through a series of narrow openings.





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## The Week.

As the season show signs of opening, prospectors who have been hibernating the past six months, begin to come out and scatter over the hillsides. Wood River, in Idaho, Montana, Alaska, Arizona and New Mexico are all attracting attention, and hundreds of men are going to those places in search of fortune. Meantime, prospecting is by no means abandoned in California and Nevada, and though new strikes are not so frequent as in newer regions, yet we are not entirely lacking in such excitements.

The news of the week shows that great activity prevails in mining matters—mines especially south of here. A good deal of machinery is going into Arizona and Mexico.

Up on the Comstock there is not much doing at present, but a development at any point along the lode would set all the old machinery humming again in about 15 minutes. The news would cause a rush to places and to arms, such as is seen at a country hotel at the stroke of the gong. It is only a matter of time, though of course the "time" seems long to such as are anxious to be making money every day and every hour. The present generation will still leave something for the coming generation to do on the Comstock.

GEO. T. MARYE, President of the San Francisco Stock Exchange Board, denies the published rumor that the Stock Exchange building is to be purchased by the Western Union telegraph company, or that it is for sale, and states that the rumor has been manufactured out of whole cloth.

THE Royal Astronomical Society are taking into consideration the endorsement of scientific research.

## Mining Investments.

If there are any men in this city who have had their money in mining stocks and have been fortunate to get it out, and who are now looking out for ready investment of that money, what numerous openings there are for them if they move quickly enough. As the spring opens, mining camps livn up, prospectors go to work, and a general revival of interest is manifest.

In California every mining county presents opportunities for the investment of capital. There are hundreds and hundreds of mines and prospects lying undeveloped for want of money to open them or put up necessary machinery. By investing in this class of property men may be able to be near the mines, and exercise more or less personal supervision over the work.

We do not mean by this that incorporations should be formed to sell stock to other people, but that the money should be directly invested by the individual or individuals. When this is done, and the cumbersome machinery of the companies dispensed with, a much more economical state of affairs exists.

Arizona and New Mexico both offer golden opportunities for men of means. Neither of them are good places for poor men, for they are now over-populated with that class of citizens; and working miners will not be needed in greater numbers until the mines now being opened are more fully developed.

Old Mexico itself is coming to the fore. Within the past two years the trade with Mexico has doubled from this city. A new steamer is now being built here to accommodate the increasing traffic. The completion of the Southern Pacific line, not far from its northern border, will also tend to open up Mexico.

Then Idaho and Montana both offer facilities for men of capital to increase their stock. First-class mines are being opened up in both these Territories, and the coming year will more than double the bullion product.

Alaska, too, is expected to come to the front as a bullion producer. As yet, however, very little is known of the mines, but this summer will prove them up.

Both Nevada and Utah offer many opportunities for investment of capital. The latter is getting over its hard time, and in doing legitimate mining work, is making more of a show than it did in the days of paper excitement. Nevada has many districts which, under the old extravagant ideas of mining, would not pay, but which under more economical management and careful working ought yet to yield millions.

SUBSTITUTE FOR PLATED METALS.—An Englishman has invented an alloy which provides an inexpensive substitute for bell metal, silver and nickel or electro-plated metals, used for making chips' fittings, harness fittings, taps and cocks. The alloy is composed of 45 to 60 parts by weight of refined copper, 20 to 30 parts of zinc, 18 to 25 parts of nickel, and if the castings are required to be turned, two to three parts of lead. The proportions can be varied according to the purity of the metals used, and the color or quality of the alloy to be produced. The copper and nickel are first melted together in a crucible, and the temperature is allowed to fall. When the zinc, or zinc and lead, are added with a small quantity of potash, soda and borax, the whole is covered with finely powdered charcoal; the temperature is then rapidly raised and the whole well stirred, then skimmed and immediately poured into the molds, or it may be cast into ingots first, in which case a greater percentage of zinc is added to make allowance for waste of the metal in re-melting. Articles made from this alloy take a brilliant polish, and in appearance resemble silver or nickel.

A GOOD STRIKE.—We see by the *Tuolumne Independent* that Garrett & James took out of the old "Turner claim," situated on Bald mountain, a short distance from Sonora, \$6,000 last week, and \$2,000 in one day this week—with more in sight. This claim has been fabulously rich in ye olden time and was considered "worked out"—but like many other mines, new blood having been instilled in them, something good has come out. Garrett, about eight years ago, left this claim, after working industriously for several years, with small profits, and established himself on the San Joaquin, where his crops dried out and burst him up. He returned to Tuolumne, and in company with another man started in his old diggings with the above refreshing results.

FIRE NEAR A POWDER FACTORY.—A fire took place at Damon's landing, near Melrose, Alameda county, last Sunday morning, about two o'clock, which destroyed entirely a warehouse containing nearly 200 tons of hay. The warehouse, we are told, stood within 100 ft. of the factory of the Thunder Powder Co., and notwithstanding the heat neither the factory nor the powder—nearly 10,000 lbs. stored ready for shipment—were in the least injured.

In Carson Valley and Truckee Meadows the ranchmen are doing their work in fear and trembling. The plow is turning up myriads of grasshopper eggs. Some of them are seriously considering the propriety of putting in no crops this season.

## Ratio Between Wages and Cost of Living.

We have taken some pains to gather up and collate a few statistics relative to the maximum average and maximum rates of wages paid for labor during the past two or three years in various sections of the United States, and also the correlative figures showing the corresponding fluctuations in the cost of living for the same time and in the same places. The article we have written to show these things is worth preserving for future reference, and should it prove to be duly appreciated by our readers then shall we have been fully repaid for time and labor expended.

One of the most curious things about the ratio existing between wages and the cost of living is the fact that, for all practical purposes, it is a constant quantity, or nearly so. To illustrate, let us suppose a mechanic receives \$40 per month, and pays out \$20 in the same time for living expenses. Now the ratio between his wages and expenses is 2. If, on account of some sudden "panic," his wages are cut down to \$30, and by dint of economy he manages to live on \$15, the ratio remains the same as before, 2. If he goes to a mining town and earns \$100 per month, while it costs him \$50 a month to live, it will be seen that the ratio is still unchanged, being simply the quotient arising by dividing the one number by the other. It is true, he now makes \$50 per month, which sounds very well abroad, but his employment is not always steady.

When we say, then, that this ratio is a constant quantity, we simply mean that, as economists have it, all circumstances being taken into due consideration, the ultimate result "amounts" to about the same thing to the laborer as to the mechanic, whether he works in a country where very high, average or very low wages are paid. It will thus be readily seen that the gist of the whole matter turns on that quaint aphorism which recites that the smallest excess of income over expenditure is wealth, while the smallest excess of expenditure over income is poverty.

The actual necessities of life cost so little in ancient Italy, that a Roman soldier could follow Caesar through all his extended campaigns, and yet save money enough to support a family out of his wages, which reached only about 14 cents a day, since it is well known that *denarius*, or Roman penny, was a soldier's daily allowance. And so, also, in our Savior's parable, the idlers who were called from the market-place, the general rendezvous for such fellows, received each man a "penny," whether they had borne the heat and burden of the day, or dragged into the vineyard at the eleventh hour.

According to a large array of statistics on file at Washington, it appears that the cost of living and average wages paid for labor have decreased about 15 per cent. during the past three years, in all parts of the Union except Colorado, California, Oregon, Minnesota and Washington Territory. In Colorado and New Mexico there have been an increase in the rate of wages paid for labor and a corresponding increase in the cost of living in those countries. These changes are due to the effect of large mining operations. Eighteen months ago, the average rate of wages paid to farm hands throughout all the States, was \$22.60 per month without board. Now, the average rate is \$20.31, or about 10 per cent. less. During a similar lapse of time in New York, New Jersey and Pennsylvania, the wages paid for farm labor has fallen over 50 per cent., while the cost of living has fallen about 10 per cent. In Virginia, Maryland, North and South Carolina and Georgia, wages have fallen 15 per cent., and the cost of living 16 per cent., thus effecting almost an absolute compensation. In Alabama, Mississippi and Louisiana, wages have fallen 5 per cent. and the cost of living 3 per cent. In Ohio, Illinois, Indiana, Michigan and Wisconsin, good farm hands now receive about \$23 per month; while a little further West, say anywhere between the Mississippi and Missouri rivers, the average pay is \$23 81. Commencing with Ohio, the figures in the last mentioned States have not materially changed for a year past. During the summer of 1877, it appears that wages throughout the country reached the lowest figures known in many years. Laborers in California receive higher pay than those east of the Rocky mountains, but then, as a rule, they are only employed during the hurried part of the season.

From what has been said, it will be easy to conclude that common laborers do fully as well in the end, in the Atlantic and Lake States as in the Pacific States and Territories. To resume the thought already touched upon, there are evidently deep under currents prevailing the great labor systems of our land, which, seemingly without the knowledge or consent of human agency, are eare to empty, sooner or later, into the undisturbed ocean of reciprocity. Justly considered, this is a study no less interesting to the employer than to the employed, and worthy to be rated as one of the leading economies of the day.

THE Tombstone M. & M. Co. has declared the usual monthly dividend of 10c per share, aggregating \$50,000. This mine has now been on a dividend-paying basis just one year, during which it has paid, including this dividend, \$600,000.

## Polar Exploration.

The steam whaling bark, *Mary and Helen*, recently purchased by the Government for \$100,000, has been taken to Mere Island, to be refitted for the search expedition after the missing *Jeannette*. Her whaling outfit is to be taken out of her, that not being included in the purchase. By the time the vessel is refitted at the Navy yard, she will have cost the Government a good round sum. Her actual value was perhaps \$35,000 to \$40,000, without taking into account the contingency of profits for the season; but, of course, like all Government purchases, two prices had to be paid. Not that the vessel is not a good one in her way, as she is new, strong and well built. It is probable, however, it will be found that she is much too large for the purpose intended. Speed is of little object where sometimes they do not make a mile a year; but size is a very important factor where the vessel has to be worked in narrow leads, and often "tracked" or hauled along by the men. A vessel this size of the *Corwin*, which went up last year, would be much more convenient.

The selection of officers and men for this expedition will be made in Washington, and it is generally believed that Lieut. A. G. Berry, U. S. Navy, will command the expedition.

We do not know what Mr. Berry's experience may have been, but think that a very careful selection should be made of some one with experience in Arctic waters. Capt. Hooper, of the *Corwin*, who went up last year, would have been an excellent choice, as his researches and experience would have been invaluable. His ice pilot, Capt. Smith, now on a whaling voyage, we believe, would also have been a valuable assistant. The assistance of one of the experienced whaling captains would also be of great service. Dr. W. H. Dall, of the Smithsonian Institution, who has spent so many years in coast survey work in Alaska, on his schooner, *Yukon*, would be among the best men that could be found if he would be willing to go. His great general knowledge, scientific ability, and experience with the currents, etc., of the coast, make him eminently fitted to command the expedition. Among others, Lieut. Schwatka was an available man. It is to be hoped that the expedition will not be given in charge of some one who has yet to gain his experience in the Arctic, as much valuable time will be lost if such is the case.

In this connection it may be stated that among the stories current in New York is one that James Gordon Bennett is seriously contemplating an Arctic expedition. Larry Jerome, who is in Europe with him, has recently written to a friend that, while Bennett is enjoying himself greatly as master of a hunt somewhere in England, he is very much depressed and anxious over the Arctic expedition which he equipped and sent out in the name of the *Herald*. He conceived it to be his duty to fit out another expedition in search of the last one, and take command of it himself. He has already telegraphed to stop work on a new yacht he contemplated building in this country, and thinks the money he proposed to spend that way shall be devoted to the building of a vessel to be speedily constructed with the view of encountering ice in the Northern seas. Already he has had some interviews with Scotch ship-builders on the subject. Therefore, the news that Bennett has seriously entered upon this new project may be expected at any time. It is characteristic of Bennett that execution follows closely upon the heels of conception.

News comes from Washington that two polar expeditions are to be fitted out and sent north early in the coming summer, under the direction of General Hazen, Chief Signal Officer, for purely scientific purposes. One, to Lady Franklin's bay, is to be under the command of Lieutenant Greeley, one of the most trusted officers of the Signal Corps; the other will sail from San Francisco and will establish itself at Point Barrow, on the north coast of Alaska. The commanding officer of the second expedition has not yet been designated.

THE Hite mine of Mariposa county, California, has been sold to some New York capitalists for \$600,000. This mine has been worked for 15 years, during which it has paid 38 dividends of \$1,370,000, the last being paid, according to a New York authority, in August, 1878. The claim contains 1,000 ft. It was formerly incorporated with a capital of \$10,000,000 in 100,000 shares. Papers of re-incorporation were filed in New York on the 1st of March, 1881. The present capital is \$2,000,000 in 200,000 shares of \$10 each. It is said that the mine has produced \$3,000,000, and that it is now producing largely. A new superintendent has assumed charge, and the renewal of dividends is promised at an early day. The Trustees are as follows: Wm. S. Clark, John R. Bothwell, Rufus P. Lincoln, M. Furman Hunt, John R. Hite, Mason W. Tyler and A. J. Bothwell.

THE Richmond Con. M. Co. paid a quarterly dividend of \$2.50 per share in London on the 5th of February. This dividend amounts to \$135,000, and added to those previously paid, shows an aggregate of \$2,855,250.

BELCHER is getting some fine pumprode of Oregon pine, each stick being from 60 to 80 ft. in length, and 16 inches square and as straight as a line.



## Coal in Arizona.

In our last issue we gave the statement that a valuable addition to Arizona's mineral wealth had been made in the discovery of beds of coal. Through the kindness of a correspondent of the Press we are enabled to publish the following particulars.

I write to inform you and through you those who are interested or contemplate investments in Arizona, of the latest and in many respects the most important discovery yet made in this Territory,—that of extensive coal deposits. The location is near Saddle Mountain, 20 miles northeast of the junction of the Gila and San Pedro rivers, and on the upper waters of Deer creek. This is 80 miles from this place in nearly a northerly direction and a shorter distance southeast from Florence. Some two weeks ago David Anderson brought in some specimens, claiming it to be coal, some of which he had used at his mine sharpening picks and drills. The news was quickly circulated about town, but created no very deep impression. However a party was fitted out by George Martin, James W. Oates and Geo. Cook, which went out to prospect the country about the head of Deer creek. The result of a week's search was the discovery of a much larger body of coal than David Anderson's party had found. This latter showed croppings, float and shale, in the easterly end of a valley about 12 miles in length, and all the ground in this vicinity with coal on the surface had been occupied when the second party reached the valley. They, however, followed down the same, occasionally finding evidences of the presence to coal, till near the southwestern end of this valley they found hundreds of acres literally covered with coal croppings. Where the waters, rushing down a wide canyon had cut a wash-out of 20 ft. in depth they found the black walle reaching from the bottom to the top, while the floor of the wash was not still through the deposit. An examination of the location discloses, what would appear at a cursory glance, to be 30 ledges all dipping into the hill to the southeast at an angle of 20°, but which are doubtless, only one or two, the surface being marked somewhat with the debris from the tall hills on that side. This party, with a few others who joined them in this valley, located 1,240 acres. In a few days this valley was full of prospectors making locations, and now nearly the entire valley between the two original discoveries is taken up and occupied.

Specimens from this southwestern discovery were brought to this city yesterday morning, and has been tested. It is a fine quality of semi-bituminous coal, generates gas well and cokes beautifully. It is free from impurities and deleterious matter, and is pronounced by competent judges to be the best article or quality of coal for this country.

This coal field is not more than 25 miles from the point where the extensive copper smelters are soon to be erected by Mr. W. A. Ballinger, and will supplement the smelting industry southeast of Globe, now bidding fair to be very large and extensive. A competent engineer estimates the cost of constructing a railroad up Deer creek to the mines at \$10,000 per mile.

Unquestionably this is a most valuable discovery, and will satisfy a need long and seriously felt in Arizona.

**A DAY'S DELAY.**—Under the writ of prohibition in the matter of the constitutionality of the debris act, now before the Supreme Court, a restraining order was asked for on Saturday to restrain the State Controller from issuing and the Treasurer from paying any more warrants upon the debris fund. Under the representation of Attorney-General Hart that there remained only some \$10,000 or \$12,000 in the Treasury to be paid out on account of debris warrants, the Court did not grant the order on that day, taking it under advisement until Monday. On Monday morning, immediately upon opening the Court, the restraining order was issued, and was placed in the hands of an agent to be taken to Sacramento and served on the proper officers. The warrants reached Sacramento too late for service on Monday, but upon the opening of the public offices on Tuesday morning, the order was served upon the Auditor, and the agent at once proceeded to the office of the Treasurer, who was in the act of paying several thousand dollars on a debris warrant. The order was served and the Treasurer refused to pay over the money. Five or six contractors were at this time waiting in the office to be paid. The Treasurer stated that he had been telegraphed on Monday that a restraining order had been issued, but not having been served with it as the law directs, he had paid out money on debris warrants during that day to the amount of \$212,000. There remain at present outstanding warrants to the amount of \$56,769.48, which the order prevents the Treasurer from paying.

A DISPATCH from Victoria, B. C., says: A Mr. Bent has arrived in town from Cowichan, and reports having discovered a lead of gold and silver-bearing quartz of great richness in the mountains, not far from the Kokesaliah quartz mining company's claim. He is said to have rich specimens, and is on his way to California to have them assayed.

## The Curtis Wine Heater.

This engraving represents a California invention of which the simplicity of construction, economy and perfect adaptation to the ends required, gained for its inventor the flattering encomiums and silver medal of the jury of awards of the Paris exposition of 1878, over all European competitors, and which certainly deserves the careful investigation of American viniculturists.

The object of the machine is to preserve wine after it has acquired its best condition after natural fermentation, against secondary fermentation, and all diseases which arise from the development within the wine of animo-vegetal parasites, such as bacteria, vibria, mycodermis aceti, etc., to liberate carbonic acid from the wine, and to render inert all glutinous or albuminous matters which cause the wine to be "rebellious" during clarification. The machine is simply the mechanical application of the well-known and well-established theory of the eminent chemist M. Pasteur, that the subjection of any fermented liquor to an instantaneous heat of 45° to 55° centigrade (112° to 131° Fah.), or to a slowly acquired temperature of 65° to 75° centigrade (149° to 167° Fah.) will destroy or render inert all germs of fermentation or of animo-vegetal life existing therein.

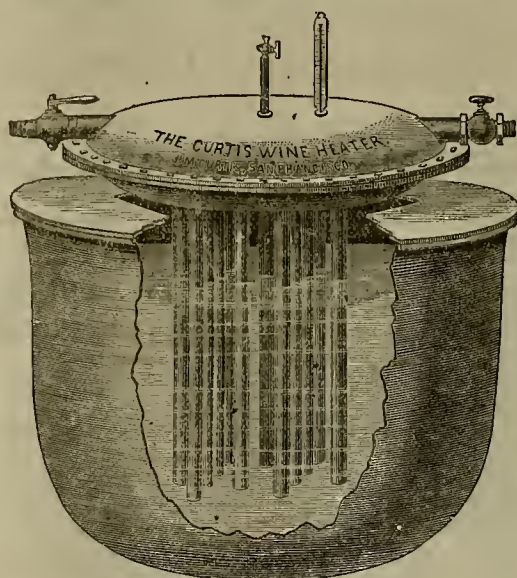
The development of M. Pasteur's system in Europe has been very rapid since 1869. It has been adopted by the French government which applies it to all wine used in the navy, enabling the cheap, light red wines of France to withstand long sea voyages, and exposure while on draught. The French vigneron has found

seconds exposure, while the California machine required only three seconds.

The flavor of wine passed through this heater is in nowise changed, nor is the process attended with any loss of alcoholic strength or of aroma. By the judicious and careful use of it, all wines are preserved, and can safely bear transportation and a moderate degree of exposure to the atmosphere. Most wines are mellowed and ripened by the process, and no wines are injured by it.

For heating the water-bath, a farmer's kettle (portable or stationary) may be used, or a copper still (the cap being removed), or a vat heated either by direct or indirect steam. The capacity of the heater within this range of 50 to 600 gallons per hour, depends on the capacity of the furnace to impart heat to the water-bath.

To operate the heater, place it over the water-bath, the tubes immersed 16 inches, leaving the bottom of the pan two inches above the surface of the water. The support for the heater should be a cover to the water-bath, so that no steam may escape from it. Connect the feed-cock (seen on the left in the engraving) with inch hose leading to the reservoir of wine to be heated. From this reservoir to the heater, the fall should not be less than six ft. To run 600 gallons per hour the fall must be 12 ft. or more. Connect the discharge valve (seen on the right of the engraving) by inch hose with the casks to be filled with the heated wine. When the water-bath is heated nearly to the boiling point, open the feed-cock (the discharge valve being closed) until the heater is filled, which will be indicated by the wine discharging from the air-cock (seen in the center of the engraving); then close the air-cock and open the discharge valve sufficiently to allow as large a flow of wine as the water-bath can heat to the required temperature. The thermometer (seen in the engraving



THE CURTIS WINE HEATER.

that heat properly applied, not only preserves their wines but gives them mellowness, fullness of body, and to red wines, increased brilliancy of color.

All the advantages derived by French and German wines from this system, accrue in even a more striking manner to California wines, which are often rough to the palate, of bad color, and tending to develop an excessive amount of free acid, or to become "milk-sour." These evils as well as obstinacy in clarification are completely overcome by the use of the "Curtis Wine Heater," and sweet wines which under ordinary conditions require fortification to the extent of 18% to 20% of absolute alcohol may be safely shipped at 10% to 15% if properly treated by this method.

The advantages claimed by the inventor for his machine, over all others which have been devised for this purpose, are

1. Economy and durability of construction.
2. Compactness and lightness.
3. Its easy adaptation to any appliance the viniculturist may possess for heating the water-bath.
4. Economy of fuel, one-half the heat acquired through the water-bath being imparted to the inflowing wine.
5. Simplicity of operation and perfect control of temperature.
6. Entire freedom of the wine during the process from exposure to the air, or to any metal except pure block tin, with which all the interior surfaces of the heater are lined.
7. The instantaneous heating and cooling of the wine. Working the heater at the moderate rate of 300 gallons an hour, each drop of wine is exposed to the heat only three seconds, thereby avoiding the "cooked" flavor and insipidity attending a more prolonged exposure, and requiring a less degree of heat than is necessary when it is more slowly applied.

In this connection it is proper to remark that the first appliances used for heating wine by Pasteur's system required from half to three-quarters of an hour; under those circumstances a temperature of 160° to 175° Fah., was necessary. The best European machine exhibited at the Paris exposition of 1878 required 40

ing between the air-cock and discharge valve) indicates the highest temperature imparted to the wine, and its indications are easily controlled by allowing a larger or smaller stream to flow through the discharge valve.

The air-cock should be frequently opened to permit the escape of any carbonic acid gas which may be liberated during the passage of the wine through the heater. The discharge of this gas is enormous from some wines, requiring the air-cock to be kept partially opened all the time. The disengagement of the gas is one of the greatest advantages derived from the process, although it was not foreseen by M. Pasteur, and in most heating machines no provision is made for its discharge at the moment of liberation from the wine, and it is consequently re-absorbed to a greater or less degree.

For heating sweet wines, a temperature of 130° to 135° Fah. should be used; for dry wines, 125° to 130° Fah. If the wine has a temperature of 70° when flowing into the heater, and is raised to 130°, it will flow out at 100°, one-half of the acquired heat being imparted to the inflowing wine. After use, the thermometer should be removed, the heater thoroughly cleaned by running water through it, and occasionally the tubes should be unscrewed and freed from any sediment which may accumulate in them. With careful use, the machine will last for many years without repairs. Any damage arising from accident or long-continued use is easily repaired by any good coppersmith. Duplicate thermometers are furnished at cost whenever required.

The "Curtis Wine Heater" is manufactured and sold in this city by its inventor, Mr. J. M. Curtis, a gentleman well-known through his connection for many years past with the California wine trade.

Mr. B. F. Clayton, editor and publisher of the *American Wine and Grape Grower*, New York, is the general Eastern agent.

A LAW was passed by the last Nevada Legislature exempting from attachment \$120 per month of a man's wages. This will make it rather difficult for miners to get credit at the stores, as business will be done on a cash basis.

## A New Vine Pest.

A Fungus that Destroys Phylloxera.

Dr. H. W. Harkness read the following paper before the California Academy of Sciences at its last meeting:

"A few days since, my friend, Dr. Behr, presented me with some grape roots obtained from a vineyard in Sonoma valley, which has been, and still is, suffering from the ravages of the phylloxera. An examination of the roots disclosed the presence of an abundant mycelium of some fungus which was distributed over the surface of the bark, forming an exceedingly delicate network covering nearly its entire surface. At times these filaments unite so as to form a cord which may be traced some distance by the unaided eye. When freshly gathered this fungus is silvery white in color; on exposure to the sunlight, it, however, soon changes to a dark brown. In this condition it is difficult to detect its presence without the aid of a lens. A microscopic examination reveals the fact that this mycelium permeates the entire bark, finding its way apparently to each individual cell, until it reaches the woody fiber, where it is plentifully distributed between it and the bark. Here its progress is arrested for a time at least, as I have as yet found no evidences of its having penetrated beyond, although I deem it nearly certain that the woody fiber will yield to its attack during the later stages of its growth. In its present condition I find it destitute of fruit. This fungus is a species of rhizomorpha, a root fungus. It is not new even in this State, as I discovered it some years since upon the roots of a lemon tree, which had exhibited signs of disease.

This pest is known in France as the *pourridie de la vigne*, and by the viticulturist as "pourridie," "champignon," "blanc" and "blanquet," and in the department of Lot et Garonne it makes its appearance in vineyards which are planted on oak clearings after about 20 years have elapsed. M. Millardet asserting that the effect upon the plant attacked is similar to that of the phylloxera. Perhaps the most important fact connected with this subject is the one stated by Dr. Behr at a previous meeting; viz., that the phylloxera disappears when brought in contact with this fungus. Some years ago M. Pasteur, in a communication to the phylloxera commission of France, predicted that a means of destroying the phylloxera by inoculation with a microscopic fungus might yet be discovered. When we take into consideration the fact that no plant or living thing has, for any length of time, dominated its fellows without receiving a check, we are prepared to receive the suggestion of Pasteur with respect. All of us are familiar with the *Saprolegnia ferax*, a fungus which destroys such vast numbers of flies during the autumn months; this is only one of many known fungoid pests which prevent the too rapid accumulation of any one species at the expense of its fellows. Another notable example is that of the partial destruction of a diptera, which was killed by a species of entomophthora, as described in a communication to the French Academy by Cornu.

Prof. Hagan, of Cambridge, Massachusetts, has recently suggested that the animal pests of our greenhouses might be destroyed by the free application of yeast, on the hypothesis that the animal might be inoculated with the spores, and so destroyed. Prof. Metschnikoff has succeeded in transmitting the "green muscardine" (isaria destructor) from one animal to another, and in so doing has proved its deadly character. Although we may not be able to furnish a remedy for this new vine pest, yet careful observations made upon the spot may lead to results of the greatest importance to us in dealing with the phylloxera.

**MELTING AND REFINING BULLION.**—Among those measures passed by Congress in its last session was an Act amending Sec. 3,524 of the Revised Statutes, by striking out the words "for melting and refining when bullion is below the standard," and inserting in lieu of these the words "for melting or refining bullion," making the section read as follows: The charges for converting standard silver into trade dollars, for melting or refining bullion, for toughening when metals are contained in it which render it unfit for coinage, for copper used for alloy when the bullion is above standard, for separating the gold and silver when these metals exist together in the bullion, and for the preparation of bars, shall be fixed from time to time by the Director, with the concurrence of the Secretary of the Treasury, so as to equal, but not exceed, in their judgment, the actual average cost to each mint and assay office of the material, labor, wastage and use of machinery employed in each of the cases aforementioned.

**NEW COIN FOR TWO MONTHS.**—The four United States mints made only 40 double eagles last month. There were none coined in January. The other coinage for February embraced \$4,064,600 in eagles, \$3,148,400 in half eagles, \$120 in three-dollar pieces, \$100 in quarter eagles, \$40 in gold dollars, \$2,307,000 in standard dollars, \$11,340 in three-cent pieces and \$25,700 in cents. In all there were 6,291,300 pieces of money coined in February, of a value of \$9,558,100. The coinage for all the mints for January and February, 1881, was as follows: Double eagles, \$800; eagles, \$7,529,930; half eagles, \$6,946,000; three dollars, \$120; quarter eagles, \$100; dollars, \$40; standard dollars, \$4,607,000; three cents, \$11,340; cents, \$55,000; total, \$19,150,330.



## Encouraging Mining Prospect.

There has been quite a stir of late in the mining interests of this vicinity, says the *Calaveras Chronicle*, and the prospects are very favorable for a lively season; in fact, there is evidently about to be another boom in quartz and gravel mining. There has been quite an influx of quartz and gravel operators, and the movement seems but just beginning. Unlike former movements of the kind, there is more earnestness manifested, and the parties visiting this locality are prosecuting their investigations in something like a business manner. Men of means are appearing in person; the inducements for investments are being carefully examined, and there are good reasons to believe that extensive enterprises will be undertaken. Candidly speaking, the mining prospect in this county has not looked so encouraging as it now does for many years. The prospecting fever has developed itself to such an extent as to awaken quite a lively interest.

That this county affords as fine a field for remunerative investments in mines as can be found anywhere, is unquestionable. Mining is not what it used to be. Making a fortune in a day is not by far so frequent occurrence as in former years. That time is past. Still, untold wealth remains locked within the bosoms of the mountains, but it requires pluck, perseverance and capital to make the earth yield its treasures. Heretofore many operations have been undertaken in this vicinity with a lack of judgment altogether unpardonable. Under the circumstances it is not surprising that the results have been failures. The effect has been to place this section of country in an unfavorable light to those who seek investment in mining property, and has been the means of retarding the development of the mineral resources of the county. But the time is fast approaching when the erroneous impression that the mineral resources of this section are exhausted will be entirely dispelled by the inauguration and prosecution of some of the biggest mining enterprises in the State. That time, too, is not far distant. The indications are strong and unmistakable, and any ordinary observer will recognize at once the certainty of numerous and extensive operations in the future, both in quartz and gravel mining. The movement is not confined to this locality alone, but the upper country gives signs of an awakening. Prospecting in that section is being carried on with the most flattering results, and there is no doubt in the world but that it will lead to the discovery of lasting and paying quartz mines. We are pleased to note the change for the better in the appearance of things, and we repeat it, that the future prospects for many years were never so encouraging as they are at the present time.

The people of Port Discovery are greatly excited over a slight gold discovery in their vicinity. The specimens of quartz forwarded to San Francisco some time since from that place assay only \$14 to the ton, but this has induced parties to start out on a mining expedition from which they expect great results.

## Business Directory.

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611 and 613 Front Street, San Francisco

## New Book on the Comstock.

The attention of MINING ENGINEERS and EXPERTS is called to the new work by JOHN A. CHURCH, E. M. Ph. D., on "The Comstock Lode, Its Formation and History." This very exhaustive treatise on this famous lode is fully illustrated with diagrams and colored charts showing sections, ore bodies, etc., and will be of great interest and permanent value for reference. DREW & CO., Publishers of the MINING AND SCIENTIFIC PRESS, are sole agents for the sale of the work. Mr. W. M. SLATER will act as their agent, and call on Mining Engineers and those interested in the great lode in this city with a copy of the book for their inspection.

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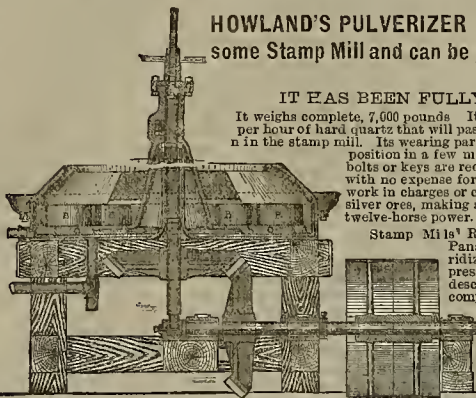
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Stamp Mills' Rock Breakers, Crushing Rolls, Amalgamating Pans and Separators for Gold and Silver Ores, Chlo. Frying Furnaces, Etc., Rock Drills, Air Compressors, Steel Shoes and Dies for Stamps, and every description of Mine and Mill Supply. Iron Work complete for Wood Frames, also.

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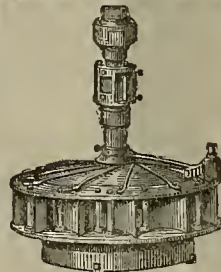
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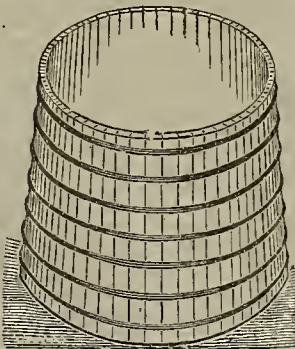
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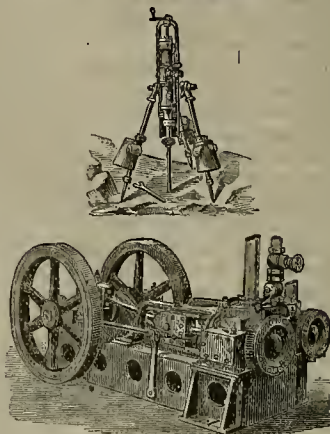
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### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING FEBRUARY 22d, 1881.

238,050.—AMALGAMATOR.—P. Plans, S. F.  
238,194.—CONVEYOR.—W. Winterhalter, S. F.

FOR THE WEEK ENDING MARCH 1st, 1881.

238,224.—HOSE COUPLING.—D. B. Kendall, Howland Flat, Cal.  
238,300.—FAUCET.—H. Mattallath, S. F.  
238,314.—VOTING MACHINE.—A. M. Stephens, Los Angeles, Cal.  
238,455.—FURNACE.—C. Stetefeldt, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### The World's Fair—The New Hitch.

The unfortunate disagreement among the original executive committees of the proposed New York World's Fair, which was finally adjusted, seems to have been speedily followed by another irritating question, incidentally introduced by Gen. Grant, who undoubtedly had no idea of this commotion which his words would cause. It appears that the General was much exercised over the feeling engendered in certain quarters by the substitution of "Inwood" instead of the Central Park as the place for holding the exposition. Many who had promised large contributions were fearful that if the grounds were selected at so great a distance—12 miles north of the Battery—that the attendance would be so much less than at the Park that the exposition would be a financial failure, and for that reason were disinclined to come down with the promised amounts. For this reason the General advised that another effort should be made to secure a location in the Park. He is reported, in an interview with a newspaper reporter, to have advised this new application "because this people of New York seem to be indifferent to a fair held at Inwood."

In urging this proposition, he suggests several radical measures, such as the inclosure of the Museum of Natural History building in Manhattan Square; also of the Metropolitan Museum of Art building, soon to be completed, as well as 60 acres of the Park, known as North Meadows, on which another permanent building may possibly be erected. A temporary railway through Eighty-fifth street, he thinks, connecting the three enclosures, would make a very neat arrangement, providing all needed facilities, and the Park proper would be preserved from injury. But just here the Park Commissioners are liable to differ. In fact, to make much advance in that direction may take "all summer," and more too. If the election of Gen. Grant to the presidency of this Fair Commission incidentally raises the questions here involved, some of the members may conclude that they have "caught a tartar." In any case, the conflict of opinions, if any conclusion is reached before Gen. Grant's departure, must be short, sharp and decisive. He is further reported as saying: "All that is done must be done soon. The next few weeks will determine whether an international exhibition is to be held in New York in 1883. A change in the feeling of the people must take place soon or the project must be abandoned. When I was chosen President of the Commission I said that I could give little attention to its work for several months on account of my expected absence, but next year I might be able to do more. I relied upon others to raise the funds and organize the work. If the people who wish the fair to be held at Inwood will come forward and subscribe for the stock, let them do it now. If they will not, then something must be done to interest the people at large, so that they will subscribe. Whatever is done needs to be done at once." But notwithstanding the people of New York are so very sensitive on the subject of "park desecrating," it is said that Gen. Grant has yet full faith in the coming exhibition; though Chicago may stand ready to take it off the hands of New York, as has been intimated, guaranteeing a complete success, he believes that there is every prospect of a greater exhibition than the world has ever seen if New York rises to grapple with the opportunity.

**A ZEALOUS PROSPECTOR.**—A German assayer recently came to the ranch of James Bagget, in the vicinity of Newhall, Los Angeles Co., having been three days in the mountains without food. This zeal for prospecting came near being fatal to him, as he was completely lost. He remained several days to recuperate and then started again, leaving a case containing an assayer's complete outfit. He has never called for them since and it is hard to tell what finally became of the unfortunate man.

**VICTORIOUS BODIE.**—The jury in the case of the Jupiter mining company against the Bodie Consolidated mining company, in the United States District Court, returned a verdict for defendant. The case has been on trial for some weeks. After three hours' deliberation the jury returned a verdict as above.

### Glove Manufacture in San Francisco.

There is a smack of historic lore attached to one of the manufacturing establishments of San Francisco of which our citizens may not be wholly aware. Mr. Fred. H. Busby, the glove manufacturer, 412 Market street, informs us that the business of glove making was carried on by his ancestors no less than 200 years ago, and from that time to the present several members of the family have been so actively engaged in this pursuit that the name has been identified without interruption with the business. About the year 1680, during the reign of Charles II., surnamed the "Merry Monarch," the cotemporary and successor of Oliver Cromwell, the Busby glove making business was established in the city of Oxford, county of Oxford, England. From time to time, during the intervening years, branch establishments, emanating from the Oxford house, have been established in various cities of Europe and the United States. Mr. Fred. H. Busby commenced the manufacture of gloves in San Francisco in the year 1874, and from that time on the business has made such rapid strides that his present spacious factory is not adequate to the demand. In consequence of this he is about to erect a three-story brick building on a large lot already selected for this purpose. This will be used for a factory, while the premises now occupied will be devoted exclusively to the purposes of showrooms, etc. Continued improvements in this manufacture of gloves have characterized Mr. Busby's career in this city; scarcely a month passing without something new being offered to his customers, which only tend to enhance his already well known reputation as master of the glove trade. That his gloves never rip he attaches mainly to the fact that they are hand sewed and "double welted," a device used exclusively by him, and for which he has been granted a United States patent. Mr. Busby claims that he can today dispose of this patent to a New York firm for a sum sufficient to render him independent of the glove business, but he avers that such is his old love for the trade that he could not exist away from the smell of a genuine buckskin.

The styles of goods made at this house embrace every variety, from the finest ladies' kid of many buttons to the heavy copper riveted mittens of California fame, all of which are driving Eastern goods completely out of this market, chiefly from the fact that the latter are wholly machine sewed. Another notable fact is the difference in the Eastern and Californian methods of tanning the hides used. The Eastern method is said to puff up the skin to such an extent that finished leather of one-eighth of an inch in thickness would scarcely be one-sixteenth of an inch thick if tanned by the Californian process. Consequently, California buckskin of a given thickness would be twice as durable as the Eastern tanned article.

During the busiest season there are between 50 and 60 men and girls employed in the factory, and experienced hands are in constant demand at good wages. Girls' wages range from \$9 to \$20 per week. The cutting is done by men who work by the piece; cutters of heavy goods receiving from \$20 to \$27 per week; and cutters of fine work from \$30 to \$45. Mr. Busby gets his buckskins from every State and Territory on the Pacific coast, British Columbia, Mexico, South and Central America. He has recently sent an order to a Sydney firm for a regular monthly supply of kangaroo hides, which his experience proves to be desirable for glove making. He also manufactures genuine dog skin gloves, the skins for which he secures by contract from this city, Oakland and Sacramento. The whole number of dog skins used amounts to from 300 to 450 per month, this being the only establishment in the United States where real dog skin gloves are made to any considerable extent. Calf skins and goat skins are obtained in this vicinity. Mr. Busby has recently been experimenting with ground squirrel and gopher skins with very flattering results. He expects to use these as a lining for heavy winter goods, and as a covering for blanket and cloth goods, of which he makes a great variety. It will be seen at a glance that "home industry" is the motto of this establishment. From the buying of the raw material to the payment of the humblest employee, "live and let live" is the principle which actuates this establishment.

The ore body in the Ontario mine is said to be 1,500 ft. long. It is claimed that \$300,000 will be expended on the works this year in developments and improvements. The monthly expenses of mine and mill average \$60,000, and there is \$50,000 paid to stockholders every month. Despite these facts, the production has been large enough to meet these requirements, and add materially to the reserve fund. The shaft is now down 800 ft., where the largest station yet made has been cut out. An immense Cornish pump is now being constructed at the East for this station. This will have a hoisting capacity for 2,000 ft. The vein on the 700 level will be cut through the 800 level by stoping. The Park City Record, from which these facts are gathered, intimates that a new mill will also be erected this year, for which there are both funds and ore.

The San Francisco copper mine at Spenceville, Nevada county, is yielding 40 tons copper cement per month. It is expected that this will soon be increased to 60 tons per month.

### News in Brief.

RED BLUFF had an oldfashioned lightening and thunder storm on the 9th inst.

MR. KEOGH started from Los Angeles last Thursday with 19,500 sheep for Utah.

THERE are 1,808 more males than females in Walla Walla county, Washington Territory.

A NEW YORK dispatch relates that Mrs. Mackay is going to quit Paris to reside in New York.

UTAH potatoes are being shipped in large quantities to Colorado, where they find a ready market.

TWENTY THOUSAND cans are made each day at Hume's cannery. This is the best work on record around Astoria.

GRASS VALLEY will have more mines working this summer than for years past. The whole outlook of the district is favorable.

The steamer *James Howard*, belonging to the New Orleans Anchor line, was burned at St. Louis Sunday evening; loss \$75,000.

GENERAL UPTON, the well known author of Upton's military tactics, committed suicide at the Presidio, in this city, on Tuesday.

THERE is a scarcity of laboring men all over Puget Sound; 40 loggers could now get employment in the vicinity of Olympia, W. T.

THE *Tribune* says the collectors of this World's Fair Commission report that conditional and unconditional subscriptions aggregate \$900,000.

THE Oregon Railway & Navigation Co. are reported to have bought up the majority of this stock of the Northern Pacific R. R. Co., so that they will control that road.

THE Governor's message calling an extra session will be made public next week. It specifies the apportionment and appropriation bills, the tax levy and amendments to the Constitution.

### Ore Feeders.

EDITORS PRESS:—My attention has been called to an article which appeared in your issue of the 12th inst., entitled "The New Mill Furnace and Lixiviating Works for the Rosario Mining Company, Mexico."

The entire tenor of that article is to the effect and seems to be intended to convey this impression that all of the appliances and machinery furnished under the contract with Messrs. Parke & Lacy are of the most approved standard patterns, and that this mill when erected will be the model silver mill of the Pacific coast.

I cannot, however, believe that such will be the result, as I find enumerated as a portion of the equipment, eight "Climax" ore feeders, and since automatic ore feeders are recognized as an important and essential factor, ensuring the regular, proper and economical reduction of ores, and effecting the crushing of 20% more ore with 15% less wear of iron than by hand feeding; and as it is a well determined fact that feeders of this "Climax" pattern do not fulfill the requirements of a first-class standard feeder, I cannot admit that they are a proper adjunct to contribute towards a model mill; for it is well known among intelligent mining men that the "Climax" feeders have never yet been run successfully in any mill on this coast; and Messrs. Parke & Lacy ought also to have been cognizant of this fact since they have been offered \$50 to show one of them in successful, practical working operation anywhere, and have failed so to do. In substantiation of the assertion that they are not up to the required standard, comes the simple fact, that not more than 40 of them have been manufactured since the issuance of the patent, and, in nearly every case where they have been unfortunately adopted they have after a fair trial been discarded; whereas there have been over 800 "Challenge" ore-feeders manufactured by Joshua Hendy, of this city, which have been fitted in all of the best appointed quartz mills in the United States and elsewhere, and have always, and are now giving perfect satisfaction wherever used, and have in many cases superseded other patterns, which, not answering the requirements of perfect automatic feeders, have been rejected.

R. B. NOYES.

San Francisco, March 11, 1881.

### Quinine and Arsenic

Form the basis of many of the *Ague* Remedies in the market, and are the last resort of physicians and people who know no better medicine to employ for this distressing complaint. The effects of either of these drugs are destructive to the system, producing headache, intestinal disorders, vertigo, dizziness, ringing in the ears, and depression of the constitutional health. AYER'S *AGUE CURE* is a vegetable discovery, containing neither quinine, arsenic, nor any deleterious ingredient, and is an infallible and rapid cure for every form of Fever and Ague. Its effects are permanent and certain, and no injury can result from its use. Besides being a positive cure for Fever and ague in all its forms, it is also a superior remedy for Liver Complaints. It is an excellent tonic and preventive as well as cure, of all complaints peculiar to malarious marshy and miasmatic districts. By direct action on the liver and biliary apparatus, it stimulates the system to a vigorous, healthy condition.

FOR SALE BY ALL DEALERS

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their notions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

### Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St. S. F.

The State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### DIVIDEND NOTICE.

OFFICE OF THE

### Eureka Consolidated Mining Company.

Nevada Block, Room No. 27, San Francisco, March Fifteenth (15), 1881.—At a meeting of the Board of the Directors of the above named Company, held this day, a Dividend, No. Sixty-five (65), of Fifty (50) Cents per share was declared, payable on Monday, March Twenty-first (21), 1881. Transfer books closed until the Twenty-second (22) instant.

P. JACOBUS, Sec'y pro tem.

### DIVIDEND NOTICE.

OFFICE OF THE

### Northern Belle Mill and Mining Company.

SAN FRANCISCO, MARCH 10, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, Dividend No. Forty-one (41) of Fifty (50) Cents per share, was declared payable on Tuesday, March Fifteenth (15), 1881. Transfer books closed on Friday, March Eleventh (11), 1881, at 3 o'clock P. M.

WM. WILLIS, Sec'y.

Office—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco.

### DIVIDEND NOTICE.

OFFICE OF THE

### Standard Consolidated Mining Company.

SAN FRANCISCO, MARCH 2, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, dividend (No. 26) of Seventy-five (75) Cents per share was declared, payable on Saturday, March Twelfth (12), 1881, at the office in this city, or at the Agency of the Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.

Office—Room 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

### DIVIDEND NOTICE.

OFFICE OF THE

### Silver King Mining Company.

SAN FRANCISCO, MARCH 8, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a dividend (No. 15), of Twenty-five (25) Cents per share was declared, payable on Tuesday, March Fifteenth (15), 1881, at the office of this Company, Room 19, No. 323 Montgomery Street, San Francisco, California. Transfer books will be closed March 10, 1881.

JOSEPH NASH, Sec'y.

### ANNUAL MEETING.

### Paris Mining Company.

Notice is hereby given that a meeting of the Stockholders of the Paris Mining Company will be held, in accordance with the By-Laws of said Company, at the office of said Company, Room 25, No. 310 Pine Street, in the City and County of San Francisco, California, on Tuesday, the Twenty-second (22) day of March, A. D. 1881, at one o'clock P. M., of said day, for the annual election of Directors, and the transaction of such other business as may properly come before the meeting. Transfer books will be closed on Friday, the Eighteenth (18) day of March, 1881, at three o'clock P. M.

WM. J. TAYLOR, Sec'y.

Office—Room 25, No. 310 Pine Street, San Francisco, California.

### Booth Gold Mining Company.—Location

of principal places of business, San Francisco, California. Location of works, Auburn, Placer county, California.

NOTICE.—There are delinquent, upon the following described stock, on account of assessment No. 3, levied on the second day of February, 1881, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
L A Booth, trustee.....	34	1,000	\$30 00
L A Booth, trustee.....	35	295	8 85
L A Booth, trustee.....	37	1,000	30 00
L A Booth, trustee.....	119	250	7 50
L A Booth, trustee.....	26	5	15
Hugh Burns.....	120	50	1 50
R Cheney, trustee.....	100	6,275	138 25
R Cheney, trustee.....	17	5	15
Thomas Day.....	148	500	15 00
T H Gordon, trustee.....	68	1,000	30 00
T H Gordon, trustee.....	112	100	3 00



T H Gordon, trustee.....	114	100	\$ 00
T H Gordon, trustee.....	116	100	3 00
T H Gordon, trustee.....	117	100	3 00
T H Gordon, trustee.....	118	100	3 00
Henry Gilmore.....	38	300	2 00
R Hunter.....	121	25	75
G A Miller, trustee.....	40	100	3 00
G A Miller, trustee.....	41	100	3 00
G A Miller, trustee.....	42	100	3 00
G A Miller, trustee.....	44	50	1 50
G A Miller, trustee.....	45	50	1 50
G A Miller, trustee.....	46	45	1 35
G A Miller, trustee.....	74	325	0 75
G A Miller, trustee.....	75	300	0 00
G A Miller, trustee.....	19	5	15
Geo R Spinney, trustee.....	06	1,000	30 00
Geo R Spinney, trustee.....	149	500	15 00

And in accordance with law, and an order of the Board of Directors, made on the second day of February, 1881, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the Auction Rooms of John Middleton & Son, No. 116 Montgomery St., San Francisco, Cal., Monday, the 28th day of March, 1881, at the hour of 2 o'clock, P. M., of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

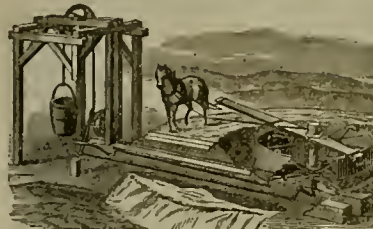
GEO. R. SPINNEY, S. C.

Office - Room No. 44, No. 314 Pine St., San Francisco, California.

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## MINERS' HORSE-POWER.

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

REYNOLDS & RIX,  
49 Fremont St., S. F.

### NOTICE.

TO ALL WHOM IT MAY CONCERN:

Notice is hereby given that George Denton Cardow is no longer a Director of the Isabelle Gold and Silver Mining Company of London, England, Limited, and that any Power of Attorney which he may have had from said Company was invalid, for the reasons set forth in the following Resolutions:

1. Resolved, that as the Power of Attorney given to Mr. Geo. Denton Cardow on the 24th of August last, was not duly authorized, and the seal of the Company was affixed thereto without the authority of a duly constituted Board of Directors, the Directors of the Company hereby repudiate all acts and things done, or caused to be done by Mr. G. D. Cardow, under or by virtue of such Power of Attorney, and that by way of caution the Directors of the Company do rescind the said Power of Attorney, but without in any way recognizing the validity of such Power of Attorney, and such Power of Attorney is hereby rescinded accordingly; and that the solicitor of the Company inform Mr. G. D. Cardow of this Resolution, and request him to return to the office of the Company, the said Power of Attorney.

2. Resolved, that the Solicitor do forward a copy of the last Resolution to Mr. Lewis Chalmers, the Manager at the Mines, and request him to advertise in such papers in California as he may think necessary, the said Resolution, or the purport thereof; and also the fact of Mr. G. D. Cardow having resigned the office of Director of the Company.

By order of the Directors, LEWIS CHALMERS, Manager.

N. W. SPAULDING'S



PATENT DETACHABLE TOOTH SAWS,  
Manufactory, 17 & 19 Fremont St., S. F.

# "THE \$1,000 CHALLENGE"

## Ore Feeder for Quartz Mills.

OVER 800 ARE NOW IN USE, GIVING ENTIRE SATISFACTION.

Awarded First Premium at the Tenth and Twelfth Industrial Fairs of the Mechanics' Institute.  
Twenty Per Cent. More Ore Crushed with Fifteen Per Cent. Less Wear of Iron than by Hand Feeding.

The accompanying cut illustrates the recently introduced Grip, and also the Spring Attachment, which replaces the Weight heretofore used, and which are obvious improvements.

It is now fully demonstrated, after careful and long continued experimentation and practical use, that the plan upon which a perfect Ore Feeder must be constructed is that of a carrier, and not that of a shaking-table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Jerky or spasmodic contrivances will not answer the purpose for wet or sticky ores.

The Challenge Ore Feeders are now in Use in the following Mills, besides many others:

Roughly.....	20	Stamp.....	Yuba county, Cal.
Sheep Ranch.....	20	".....	Calaveras "
Mahoney.....	43	".....	Amador "
Zelle.....	49	".....	" "
Placerville.....	41	".....	El Dorado "
Cross.....	59	".....	" "
Julian.....	50	".....	Placer "
St. Patrick.....	15	".....	" "
Providence.....	20	".....	Nevada "
Omaha.....	30	".....	" "
Green Mountain.....	50	".....	Phimas "
Phimas-Eureka.....	60	".....	" "
Bulwer-Standard.....	30	".....	Bodie Dis. Mono. "
Standard.....	20	".....	" "
Noonday.....	30	".....	" "
Bodie.....	40	".....	" "
Christy.....	5	".....	Utah Co., Utah.
Ontario.....	40	".....	Parley's Park "
Contention.....	20	".....	Tombs' one Dis, Arizona
Grand Central.....	20	".....	" "
Harshaw.....	20	".....	Patagonia, "
Sunshine.....	20	".....	Idaho Springs, Col.
Homestead.....	20	".....	Black Hills, Dakota.
Hidden Treasure.....	40	".....	" "

### Superiority of the "Challenge" Ore Feeder Demonstrated!

At the "Christy" Mill, Uintah County, Utah, the "Eclipse" Feeders, (conceived by E. Coleman) were introduced, but not carrying a regular supply of ore for the crushing capacity of the stamps, were replaced by the "Challenge," which are now running and the stamps crushing forty (40) per cent. more ore than was done by the "Eclipse."

The "Harshaw" or "Hermosa" Mill, of Patagonia District, Arizona, was also originally fitted with "Eclipse" Feeders, but after a few weeks a trial they were pronounced inadequate to the work, discarded, and the "Challenge" adopted.

The "Silver King" Mill of Arizona, also removed the "Eclipse" Feeders to give place to the "Challenge."

The "Sola" Mill of Brown's Valley, Yuba County, Cal., was fitted with "Victor" Feeders, manufactured by E. T. Steen, but proving insufficient, the "Challenge" Feeders were substituted.

Four of the "Victor" Feeders, manufactured by E. T. Steen, were also placed in the "Alexander" Mill, at Grantsville, Nevada, but after a fair trial were discarded, and Kennedy's Feeders fitted, and four others of the same pattern added when the second twenty stamps were erected.

These cases are simply cited from among many similar instances, in proof of the vast superiority of the "Challenge" Feeders over all others.

Mr. H. W. GREENWELL, of the Tingen Mine, El Dorado Co., or any other person can make \$4,000 by disproving the acknowledged superiority of my "CHALLENGE" Feeder, in a competitive trial, side by side, with any other Feeder, on wet or sticky ore from any mine, and I will give \$100 to any one who will procure the acceptance of this challenge, and arrange for a fair and impartial test on merit.

I mean business, Gentlemen, "either put up or shut up."

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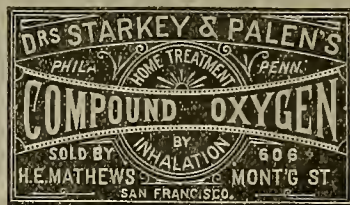
THE MINING AND SCIENTIFIC PRESS PATENT AGENCY was established in 1860—the first west of the Rocky Mountains. It has kept step with the rapid march of mechanical improvements. The records in its archives, its constantly increasing library, the accumulation of information of special importance to our homes inventors, and the experience of its proprietors in an extensive and long continued personal practice in patent business, affords them combined advantages greater than any other agents can possibly offer to Pacific Coast inventors. Circulars of advice, free. Address.

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PRACTICAL BOILER MAKER.

Marine, Stationary and Portable Boilers, Smoke Stacks, Hydraulic Pipe, Oil or Water Tanks, Ore and Water Buckets, Gasometers, Girders, Bridges and Iron Ship Building.

ALL KINDS OF SHEET IRON WORK.

Repairing promptly attended to at the lowest possible terms.

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All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE. J. H. WEED. V. KINOWELL.

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FOR CONCENTRATING GOLD, SILVER, LEAD AND COPPER ORES.

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WIND MILL. One of the best made in this State for sale cheap on easy terms. Address, W. T., care of Dewey & Co., S. F.

GEORGE W. PRESCOTT.

IRVING M. SCOTT.

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VERTICAL ENGINES,  
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AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
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ETC., ETC.

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Having Built nearly every successful working Furnace on the Coast, we are prepared to guarantee the best results attainable in all classes of Ores.

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Beyond Question the most economical and perfect working Engine now made.

WALKER'S COMPOUND STEAM PUMPS.

The best in use. Will work with thirty per cent. less steam than any other Pump in the market.

Sole Agent for HOWELL'S IMPROVED WHITE FURNACE.

The only successful Chloridizing Furnace made. Over fifty of them in use on this Coast.

Parties Wanting any kind of Mining Machinery are requested to send for Illustrated Circular.

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Stationary and Compound Engines, Quartz Crushing and Amalgamating Machines, Flour, Sugar and Saw Mills.

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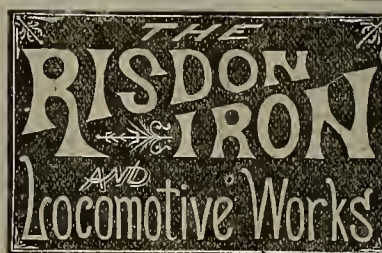
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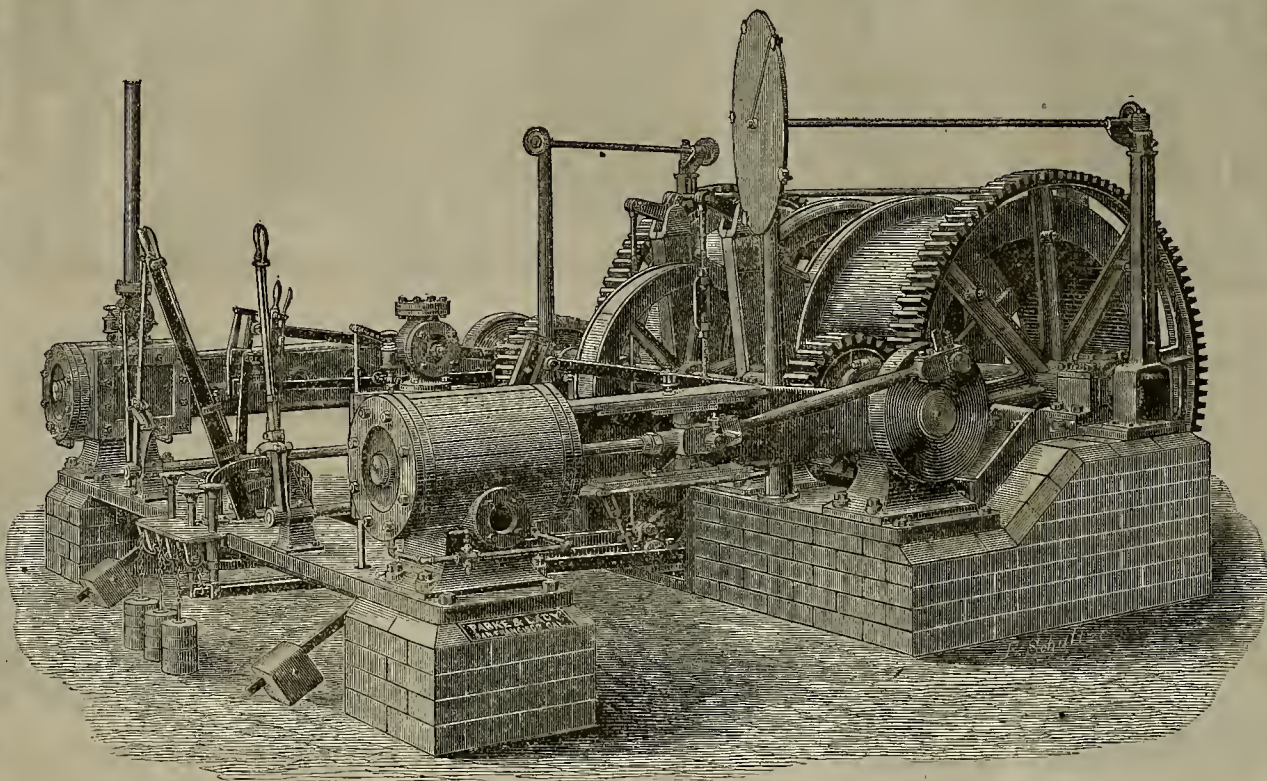


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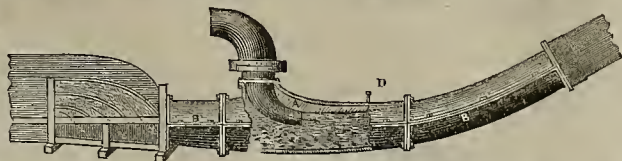
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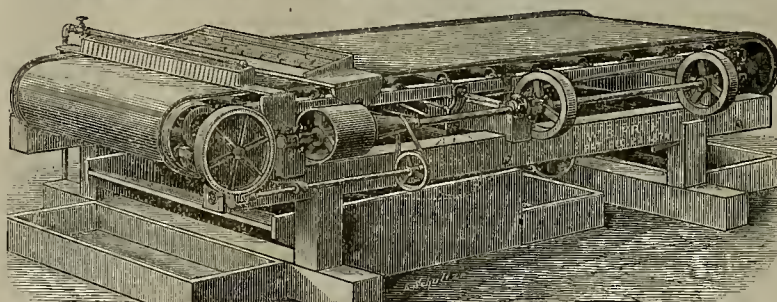
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, MARCH 26, 1881.

VOLUME XLII  
Number 13.

## California Mines.

An impression seems to prevail to some extent that because other sections of country are prosperous in mining matters, and people are leaving California for those sections, California mining matters must be at a standstill. This is by no means the case. California mining is now being conducted on a more substantial basis than ever before. While there have been no great excitements, no special advertising and no great stir over the mines of this State, they have been, and are, doing well and generally paying their owners.

Until Bodis came to the front there were very few California mines called on the Stock Board, but at that time a number were put on the lists. On the decline of stock gambling it was generally supposed by those with only a superficial knowledge of the matter, that the California mines felt the result to their detriment. This is not so. The stock market had very little effect on California mining, for the reason that our mines were not favorites to deal in, with the exception of a few of the Bodis. The great mining counties of the State were, some of them, not represented on the Board by a single mine.

Up in the mountains where mining is carried on, work is progressing steadily at the various mines. The owners attend to their business and work away without much reference to outside influences. The owners are seldom heard of. Nothing is telegraphed about properties unless stock is to be sold. As most of the mines of this State are not stock jobbing enterprises, we do not hear of their being heralded abroad as bonanzas.

As an illustration of how mining matters are going on in this State we may quote the following paragraph from the Nevada Transcript, published in Nevada county, the most prominent mining county in the State.

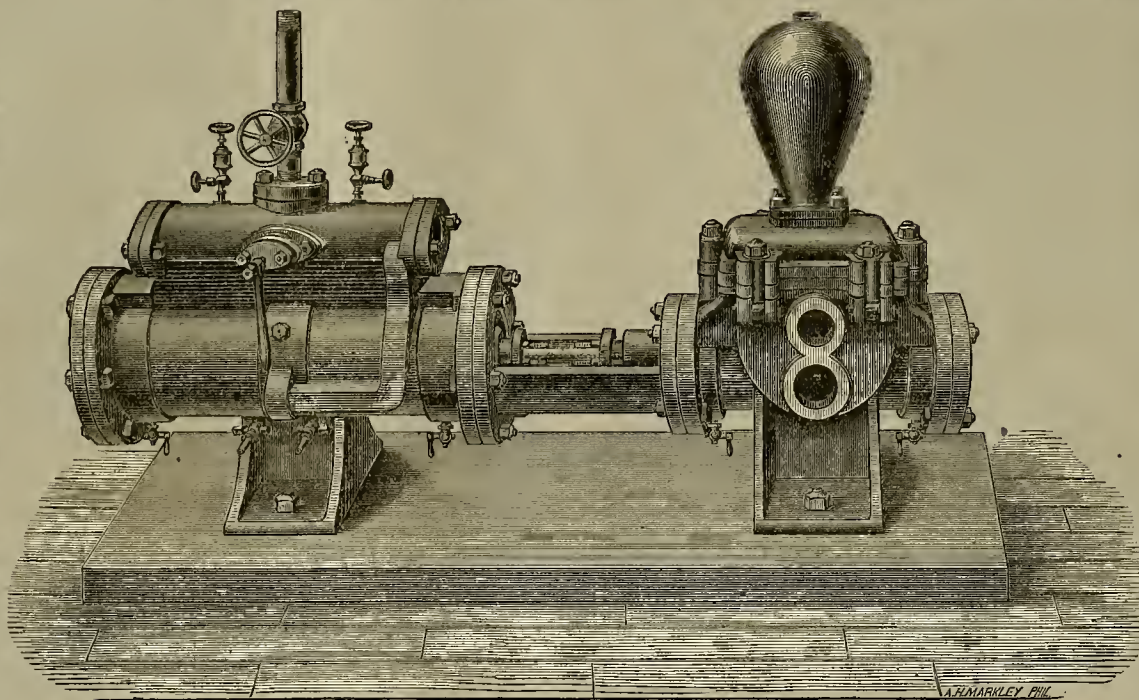
"Every indication points to the fact that we are to have a lively mining season, and perhaps one which will excel all others in the past. There are more hydraulic mines in operation than there have been in a great many years, and their clean-ups thus far have been larger than usual. The Hirschman claim is the only one not in operation. The quartz prospects here were never better than they are now. There are more first-class claims in operation than ever before, and a larger number of good claims whose prospects are exceedingly flattering, to say the least. Before many months there will be sixty new stamps added to the already large number in this district. This of itself will give work to two or three hundred more men, and should bring renewed prosperity. There will be, before the year closes, twenty new stamps erected at the Murbie, a new twenty-stamp mill at the Mount Auburn, and twenty more stamps added to the Merrifield, making sixty in all, as far as heard from."

We do wish some of the New Mexican papers would stop telling us about the funding bill and the cabinet, and give us some more information about their mines. A great many people are looking in that direction for mining properties, and think of going to New Mexico to settle. The politicians interested in the other questions are more probably looking toward Washington.

## Walker's Compound Steam Pump.

This pump is the invention of Mr. Wm. Walker, an eminent British engineer, and though largely in use abroad and in the Eastern States has only of late been introduced into this market, with a full variety of styles and sizes. Messrs. Rankin, Brayton & Co., of the Pacific Iron works, having perfected an arrangement for manufacturing here, now offer them to the trade of this coast as essentially a home production, and as a valuable contribution to this important class of machinery.

The great saving of steam, and consequently of fuel as developed in compound engines, is now too, well known throughout the mechanical world to need more than a reference. This,



WALKER'S COMPOUND STEAM PUMP.

however, is the first time such an application has ever been made to a pumping engine. The inventor has happily embodied in one steam cylinder this important principle, in such a simple and cheap form that these compound cylinder pumps can be furnished at a less price than pumps of ordinary construction with a guarantee of a saving in running expenses of from 30 to 40%.

This high pressure and expansion are both carried on simultaneously throughout the entire stroke, thereby maintaining a more uniform aggregate piston pressure to the end of the stroke than would be possible with high pressure and expansion in one chamber, and yet giving a slightly reduced speed at the end of the stroke that facilitates the quiet closing of the pump valves.

The steam, having performed its work in the high pressure space, is afterward expanded, thereby extracting all the power possible from it, and effecting an enormous saving in fuel, as compared with ordinary high pressure direct acting steam pumps.

They deliver a constant stream, work noiselessly and without friction, with either steam or compressed air, and are made to force water to any desired height.

They are specially recommended for mining purposes on account of their economy of steam, general simplicity of construction, strength and durability.

All pumps are thoroughly tested under steam before leaving the works, and are guaranteed to give full satisfaction.

MINERS QUARRELS AT NORTONVILLE.—From reports received from Nortonville, it appears that a feud has long existed between the miners of Italian birth and those of other nationalities, principally Welsh, employed at the Black Diamond coal mines. National prejudices and jealousies and strong drink are at the bottom of it. This long standing feud has frequently culminated in street and pot-house broils. Lately a number of miners came to Nortonville from the Nanaimo, British Columbia mines. Since their advent the feud has been intensified, and the ordinary peaceful and quiet town of Nortonville has been frequently turned into a scene of turbulence and drunken conflicts. Last Saturday evening the hostile gangs indulged in frequent potations and near the hour of midnight, when well primed with bad whisky, paraded the street and finally met. The meeting was the signal for an immediate renewal of hostilities.

## The Bi-Chloride Process.

An item has been going the rounds of the press to the effect that a Frenchman named Designolles has invented an apparatus or process for working gold ores, the principal feature of which is the use of bi-chloride of mercury for amalgamation instead of the pure metal. This bi-chloride is, in solution, mixed with the ore, and in this state it is said that amalgamation is more perfectly accomplished than by the ordinary processes in vogue.

This discovery was first announced some two years since, but although it makes a very pretty laboratory experiment there is no probability of its answering in practice in a large way. A gentleman writes from France to the London Mining Journal, and describes the experiments he

saw made by M. Designolles, but declares they were unsatisfactory. So far as the apparatus was concerned he saw nothing whatever new, for the cast iron barrel on a horizontal shaft, with its iron balls and circular convex and concave copper plates of about two and one-half ft. in diameter, on a vertical shaft underneath the barrel, and on next floor were quite familiar appliances. The experimental trial was altogether unsatisfactory, because he did not see, and was not even told, how much gold dust had been mixed with the already crushed quartz; neither was he informed how much of the latter was placed in the barrel, or what quantity of the bi-chloride of mercury had been used with it in the operation, which continued for 10 or 15 minutes. At the conclusion he saw but little—a few minute globules of quicksilver on one copper plate and a trace of what was stated to be gold. This gentleman came away disappointed, and concludes as follows: It may be a

pleasing and interesting experiment in the laboratory and as a novelty, but of no practical utility, for the mine has yet to be discovered rich enough in gold to afford the immense expense of the Designolles process. Bi-chloride of mercury by this process is worth 4s. or 5s., and this quantity would be equal to about a good quart of the saturated solution approximately. Imagine, then, only one ton of crushed quartz subjected to this treatment, and that every grain of it must be in direct contact with the bi-chloride solution for a complete operation, and then consider how many quarts it would require to wet or saturate the one ton. Then, too, if crushing 50 or 100 tons every 24 hours, consider also the immense quantity of bi-chloride solution, and its subsequent treatment and expense. To me it appears preposterous in the extreme. The idea of using such a costly agent to extract, say one-half, or even one or two ounces of fine gold dust from 3240 lbs. or one ton of quartz. If the few pennyweights of gold per ton could be concentrated by an economical, speedy and effective process, so as to reduce the ton of crushed quartz to a very few pounds, then the bi-chloride solution might be profitably used.

AN ACRE OF LEAD.—On the yard directly west of the Richmond company's refinery, says the Eureka Sentinel, is a stack of lead which has been accumulating for a long time. Our Sentinel reporter computed the weight of the mass at 93,400 tons. It covers an area of 130 by 60 ft., and is piled to a height of seven ft. in some places.

ANTELOPE MINE.—Capt. Griffin to-day sent out a Dodge concentrator to the Antelope mine in Long valley. A true concentrator is already there. The Captain hopes to have the machinery all in place and the mill running again in two weeks. Eighteen men are at work in and about the mine, and there are over 800 tons of ore on the dump.—Reno Gazette.

A NEW YORK mining paper copying from an Arizona paper the statement that a certain mine had been relocated, gravely asks: "Will not our contemporary tell us what becomes of the share of the old Isabella company under this relocation?" As far as the stock is concerned it may be kept as a memento, as it will be as good for that as for any thing else.



## Sawyer's Bar.

A correspondent of the *Del Norte Record*, writing from Sawyer's Bar, says: On Monday last I got aboard a mule and started for the Last Chance country on a small creek emptying into the south fork of the Salmon river, and known as the Niggerville creek. On this gulch we last summer discovered some of the richest quartz lodes ever found in this vicinity. The owners are Meere, English, Doran and Grant. Their quartz is very rich and they have plenty of it. They intend putting in an engine next summer, which will enable them to run the mine during the entire year. A few hundred yards further up the creek is another location called the Enterprise, owned by Messrs. Henry Quinn, James Nalley, and others. They have done considerable work, building and prospecting, and are confident that they have a bonanza. Two or three hundred yards up the mountain side, above the Enterprise mine, is located another ledge, called the Columbia, and owned by Messrs. Hutchinson and Knapp. The proprietors are sure that they have all they want to make them both millionaires, and they certainly have rich quartz, together with energy and muscle to put it through. About one mile up the creek from the Last Chance mill is another lode, called the Gratten, owned by Messrs. Quinn, Patton, and Cunningham. As far as I am able to judge, they have as good a prospect as anyone on the creek; two ft. of fine looking quartz which they think will pay \$100 per ton. They will build a mill in the spring, if the present prospects hold good. Here are four quartz ledges within one mile of each other all prospecting well and having every indication of permanency. These discoveries have had a good effect on all branches of business here; encouraging prospectors and others to renewed exertions and efforts to secure claims for themselves. A new trail is now being constructed from the Last Chance locality to this place, which will shorten the distance from 10 miles to 7 and will be a better trail. So much for the new quartz mines.

## Chiricahua Mountains.

A correspondent of the *Arizona Mining Journal*, writing from Fort Boise, Arizona, says: This place is the center of a large mining country. It is situated in the midst of the Chiricahua mountains, at Apache pass, which at one time was the stronghold of the Apaches. In the rear of the fort is a gold mine, which several years ago was worked to advantage—but in 1869 the owner, Colonel Stone, and six men were killed in the Dragoon pass by the Indians, on their way to Tucson with a large amount of gold, the product of their mine. Since then it has not been worked and has been relocated by others.

To the west about 12 miles is the "Doe Cabezas" mining camp, which is being developed. The mills are at work testing several of the rich veins.

To the east of us is the California district, which is in its infancy, but many fine developments have been made; among them is the Texas and the Dan mine.

About eight miles from the fort, east, some fine ore has been found in Josephine mine. It has been mined for \$24,000.

To the north of them, there have been some very rich locations made, of smelting ores, galena, which assays into the hundred, and plenty of it, the great point, and easily got at, with plenty of wood and water. In fact all around us, gold, silver and copper have been found in great abundance, and it only requires capital and time to make this one of the richest mining sections of the Territory.

I have been from camp Apache, north, to the Mexican boundary, in the Chiricahua range, and in the district section.

The copper vein extends from Bisbee over to camp Rucker, through Swisshelm district, thence west in this range.

**A SMELTER INVENTION.**—Superintendent A. Arents is the inventor of a very necessary contrivance for use in connection with lead furnaces used in smelters. This invention is a syphon tap, through which the liquid bullion runs up hill into a basin at the top of the tube. Nearly all smelters use this convenient and simple apparatus, and for its use a royalty of \$1,000 per year is allowed Mr. Arents. The Grant smelting works of Leadville have nine of them in use, which they claim are different in some particulars from the Arents patent, and consequently refuse to allow the royalty, but a suit is pending in which the courts will decide whether or no the royalty shall be paid the inventor. The mode of relieving the furnaces of the mineral heretofore was to allow it to run out at an aperture made in the bottom of the furnace, but much of the slag would be allowed to come with the molten mineral, and was a great inconvenience in refining. —*Robinson Tribune*.

**THE PAINS OF HIGH STATION.**—Virginia Chronicle: "It's all right to say that George Washington never told a lie," remarked a thoughtful mining superintendent to-day. "I don't say he did; but he lived in a time when that wasn't hard for a man to accomplish. If George was alive now and running my mine and had to write a weekly letter reporting progress, I'm inclined to think he'd wrap crumpled his little hatched and put it away where the historian of the future wouldn't be likely to find it."

## Mexican Mines.

The following is a list of the mines in actual work in Altar district, State of Sonora, derived from official sources, together with the width of vein and owners' names:

NAMES OF MINES.	Width of vein in ft.	Kind of ore.	Owned by—
San Yacelo.....	5	O. & S.	Tully, Ochoa & Co.
Espanaño.....	3	G. & S.	Tully, Ochoa & Co.
Las Animas.....	3	G. & S.	Tully, Ochoa & Co.
Purísima.....	3	G. & S.	Tully, Ochoa & Co.
Robozadero.....	3	G. & S.	Tully, Ochoa & Co.
Santa Gertrudis.....	2	Silver	Tully, Ochoa & Co.
San Clemente.....	1 1/2	Silver	R. Gimenes & Co.
San Blas.....	2	Silver	H. Halse & Co.
Santa Maria.....	2	O. & S.	J. Contreras & Co.
La Campana.....	3	Silver	M. Escalante & Co.
Porvenir.....	3	Silver	F. Lema & Co.
Las Animas.....	2	Gold	F. Lema & Co.
La Virgen.....	2	Silver	F. Lema & Co.
Refugio.....	5	G. & S.	F. Vasquez & Co.
Vedra de la Saturno.....	6	Silver	J. Cardero & Co.
San Juan.....	3	Silver	A. Frederico & Co.
Rinsena.....	5	Gold	J. Cruz & Co.
San Manuel.....	7	Gold	F. Lizarraga & Co.
La Cubabi.....	8	C. & S.	Y. D. Serrano
La Dura.....	4-5	Silver	A. Bon & Co.
La Convencion.....	4	Silver	A. Bon & Co.
Durazno.....	5	Gold	S. Carrizosa & Co.
La Plomera.....	4-6	O. & L.	A. C. Cabro & Co.
Saturno.....	15	O. & S.	Luis Redondo & Co.
El Rosario.....	2	American Co.	
Descubridora.....	1-6	American Co.	
Republicana.....	4-10	American Co.	
Cerro de Oro.....	2	American Co.	
Providencia.....	2	American Co.	
San Emeterio.....	1 1/2	A. Ortiz & Co.	
Cenepcion.....	3	D. Oviedo & Co.	
El Zonzonte.....	4	American Co.	
La Bonita.....	5-7	American Co.	
San Francisco.....	7	American Co.	
San Julián.....	12	A. Ortiz & Co.	
Potosí.....	9	M. Escalante & Co.	
Carmela.....	8	A. Ortiz & Co.	
La Graciosa.....	12	A. Ortiz & Co.	
Santa Rosalia.....	8	American Co.	
Mina Orande.....	10	American Co.	
Mina Alberca.....	5	American Co.	
Oro Blanco.....	5	American Co.	
Tajitos.....	4	American Co.	
Armentilla.....	9	American Co.	
San Jose.....	7	M. Escalante & Co.	
Santa Margarita.....	3	M. Escalante & Co.	
Argentina.....	5	M. Escalante & Co.	
El Teroro.....	4	M. Escalante & Co.	
E. E. de Santa Margarita.....	3	M. Escalante & Co.	
San Felix.....	3-4	American Co.	
Buena Vista.....	4	American Co.	
San Pedro.....	7	American Co.	
Providencia.....	4	American Co.	
Cholena.....	4	American Co.	
Morena.....	4	American Co.	
San Pablo.....	3	T. C. Mills & Co.	
Pozo Prieto.....	4	E. Araiza & Co.	
La Papagaio.....	4	F. P. Foster.	
Soledad.....	2	E. Araiza & Co.	
La Union.....	2	F. Lizarraga & Co.	
San Jose.....	2	F. Soto & Co.	
El Hallazgo.....	2	F. Lizarraga & Co.	

## Pumping.

Some Big Work in that Way Soon to be Seen on the Comstock.

A good deal of pumping is now going on at the main shaft of all our leading mines, and there will soon be a great deal more. The Suto Tunnel Co. will do well to look to their drain boxes in the main tunnel and their drainage facilities generally. It is to be hoped there will be no long delay on account of drain boxes for the south branch. The big pumping machinery of the Yellow Jacket Co. will be all ready to start up before the connection is made, and all wish to see them put in motion as soon as possible. When they start up, and a start is made by the big hydraulic pumps at the Chollar-Norcross-Savage shaft, an immense volume of water will be sent into the Suto tunnel in addition to that now flowing that way. Next month we shall see some of the biggest pumping ever in progress at any one time on the Comstock. No fear of the result may be entertained. The pumping apparatus is of such great powers that it will send a perfect river of water rolling up from the lower regions. Then let it be borne in mind that there are no extensive openings in the mine to be drained. The flooded levels are not opened, and all there is to be drained is outside of shafts and inclines in a few straight drifts.

In "Domhey and Son" we are told that pumping in the Peruvian mines broke the heart of Mrs. Pipchin's husband. If Mr. Pipchin could have had such pumping machinery as is now on the Comstock he might not have left the respectable Mrs. Pipchin a widow. Even when pumping fails and breaks hearts, it is still a worthy effort and disgrace no one. Did not the great and good Mr. Domhey himself condescend to say when he heard of the little accident to Mr. Pipchin's heart, and the cause of it, that it was good and had a "rich sound." Mrs. Pipchin, also, evidently thought the same way, as she never lost an opportunity of mentioning the fact that she was the widow of a heart-broken Peruvian mine pump. Doubtless many people, like Miss Tox, pictured the defunct Mr. Pipchin gasping out his last breath with his hands still clinging to the handle of the pump.

Although pumping two inches of water with a pump that throws a one inch stream is doubtless heart-breaking business, we have no fear of the result of the big pumping operations soon to be seen on the Comstock. Indeed, we expect to see stocks take an upward move when the monster hydraulic and steam pumps begin to pull together. We shall then begin to learn something about the unexplored regions of the lode lying between the Savage and the Belcher. —*Virginia Enterprise*.

## Copper Deposits of Silver Bell District.

Mining should be conducted more after the manner of a substantial business investment or enterprise, and in this manner the Huachuca mining and smelting company are carrying on their operations. Mr. W. B. Scott, its superintendent, was interviewed by a representative of the *Arizona Mining Journal*, and from him it was ascertained that the company, although it owned several valuable mining properties in the Huachuca mountains, was at present paying most attention to some recently purchased in the Silver Bell district, the names of which are the Old Boot, the Blue Coat and the Copper King. The only work upon these mines of any consequence was commenced the first of this month, and since that time on an average of 18 men have been steadily employed. The first mentioned property, near its southeastern end, has a cut running with the vein, 30 ft. in length, which shows up a sheet of ore 6 ft. in width. The ore is a red oxide of copper, carrying considerable iron. A shaft is being sunk near the center of the claim. It is now down 12 ft., and is all in ore. It may be here noted that this shaft has been sunk in a large open cut, which of itself displays 20 ft. of ore. From the entrance of this, down the hill for 40 ft., the vein can readily be traced, and consequently at this point it must be fully 60 ft. in breadth. There are at present 60 tons of ore on the dump from this shaft alone, and it will all average fully 20% copper. Northwest of these workings, 350 ft., there is another cut which displays a pay streak 12 ft. wide. Here the oxides are mixed with copper pyrites, but it all runs as high as 20%. On the Blue Coat there is an open cut about 30 ft. in length near its northwestern end. An excellent body of 23% copper ore, 7 1/2 ft. across, is here shown. Near by a working shaft is being sunk, which will strike the vein at a depth of 20 or 30 ft. From this shaft drifts will be run at such distances as may be deemed best for a proper development of the mine.

These properties are arranged in line in the following order, from southeast to northwest: Copper King, the Blue Coat and the Old Boot. At the point of connection of the two last mentioned claims, the iron cropping and conglomerate have been removed and 60 ft. of ore brought to view. The company now has 500 tons of ore on the dumps, and enough is now being taken out daily to

## Supply a 30-Ton Furnace.

One of this capacity will shortly be ordered from either the Pacific Iron Works, or Prescott, Scott & Co. of San Francisco. It will be of the water-jacket type. In 90 days, at the latest, it will be running. A site has been selected about a mile from the mines, where water can readily be obtained by sinking a short distance. Already several wells have been dug, and water rises in these to within eight ft. of the surface. A test of draining these wells has already been attempted, but it fortunately proved unsuccessful. In fact, the natural water level for a large tract of country appears to have been here found. A number of men will soon be set at work digging several more wells, and another force will before long commence work on a road from the mines to Red Rock station, on the S. P. R. R., a distance of 15 miles, the requisite expenditure for which will probably be under \$500.

**IRISH IRON ORES.**—Notwithstanding the disturbed state of some parts of Ireland, we are glad to learn that large quantities of iron ore are being peaceably and regularly shipped from the north of Ireland to this country and America. Some little time since we visited one of these undertakings which so largely conduce to the prosperity of the district—the Evishacrow mine, near Ballymena, belonging to Mr. Chas. Chambers, of Westminster, whose agents for the ore are Messrs. Henry Hughes & Co. of Gracechurch street, London. The Evishacrow ore contains about 43% of metallic iron, and is of singular purity, having no trace of either sulphur, or phosphorus. This class of ore is being extensively used in steel-making. These mines are connected by a branch with the Ballymena, Cumbrell and Red Bay railway, which enables the ore to be sent either to Belfast or Lerne for shipment. The latter port, which is well known as one of the safest harbors in Ireland, has been made accessible during the last few months by the completion of the Ballymena and Lerne railway, which, we understand, was originated by Mr. James Chaine, M. P. for the county of Antrim. A considerable quantity of Evishacrow ore is shipped at Lerne.—*Iron*.

**BEVERIDGE.**—Taylor, McEvoy & Co.'s mill is running steadily on the rich gold ores of that district. Things are lively in the Mexican camp. Eleven arrastras are running on selected ore, that pay \$150 per ton. Quite a number of men are in the camp prospecting, and several fine veins of gold quartz have been found. Moreno & Fuentes, who own the largest mine, allow outside parties to go on their claim and take 25-ft. sections, stripping the top of the vein to a depth of some six ft.; one-third of the ore taken out is claimed by the owners of the mine; the parties taking it out can have their two-thirds worked in the arrastras, or take it elsewhere, as they please. The mines are near the summit on the east slope of the Inyos; the country is terribly rough, and no wagon roads can be made to them nearer than the base of the mountains. It seems to be a settled fact that this will prove a rich and prosperous mining camp, notwithstanding its inaccessibility. —*Inyo Independent*.

## Rye Valley Mines, Oregon.

From a recent number of the *Bedrock Democrat* we take the following concerning the Rye Valley mines:

Rye Valley mining camp is situated about 35 miles south of Baker City, in Baker county, Oregon.

Powers & Co. own and operate the placer mine, water rights and ditches. Their mines consist of 40 acres of heavy gravel banks, from 6 to 30 ft. deep, paying from gravel roots to the bedrock. In the mining season they run three hydraulics, each averaging from \$100 to \$125 per day; besides selling large quantities of water to other claims. Their flume or creek ground consists of 234 acres, patented, which has been sufficiently prospected to prove it of great value. Three-quarters of a mile above these rich placers are located the celebrated quartz mines belonging to the New England and Oregon mining company, incorporated under the laws of Connecticut, with head office in Concord, N. H., with Benj. F. Cedwallader, President; John W. Drew, Secretary, and a Board of Directors of the most prominent business men in that State.

The property consists of "Green's Discovery," "Monument," and "Macedonian" lodes, all true fissure veins; a splendid steam quartz mill, of latest improved machinery and perfect in all parts; a saw mill attached and run by same power; a blacksmith shop, boarding house, sleeping room and superintendent's office—all kept in splendid condition.

This company commenced operations last June, mostly developing the rich ore bodies in the "Green Discovery." Working has been planned with care and judgment, and successfully carried out, which the output of rich ore now on the dumps and in eight in the mine will verify. The foreman is an experienced miner, and thoroughly understands the underground workings of the mine.

Mr. Locke is now East purchasing new machinery and hoisting works, for erection on the Monument next summer. It has not reached that state of development to tell its actual value. A shaft has been sunk on the ledge to water level, which develops a true fissure vein of rich ore, showing large quantities of native and horn silver, some samples going over 9,000 ounces to the ton, and others running far into the hundreds. It takes no prophet to predict an early advance of the company's stock. Work, so far, has been done in a very substantial manner, all timber and wood necessary for the winter, as well as other supplies, were laid in last fall. The company is proceeding strictly on the true plan of development—working its mines instead of its stock.

The Oregon branch of the U. P. R. R., commencing at Granger City, on Green river, will be completed to Baker City inside the next 16 months; the line of survey runs within six miles of Rye Valley. The O. R. & N. Co.'s road from Portland to Baker City will be completed next fall. The completion of these lines and telegraphic communication will greatly enhance all mining property in eastern Oregon.

To tell all about Rye Valley, its brilliant prospects, rich mines, both quartz and placer, its many inducements for the investment of capital for legitimate mining, would take more space than we can spare in this issue. But for quality of quartz and gravel, characteristics of permanence, facilities for working, cheap and skilled labor, abundance of wood and water, climate, etc., makes Rye Valley bid fair to become one of the most productive mining camps in the vast rich mineral belt of eastern Oregon.

## American Mining Companies in Mexico.

There are to-day in the State of Chihuahua, says *El Fronterizo*, six American companies engaged in working mines. We will make a brief mention of them. The mining company of Santa Eulalia owns the famous mines of that name, 16 miles from the city of Chihuahua. In former years these mines paid to the Catholic church contributions, or taxes, to the amount of \$11,000,000. Although they have been worked for many years, they are still very rich. The Americans have been deliberating on piercing the mountains by a tunnel, and constructing a railroad as far as the confluence of the Sacramento and Chihuahua rivers, so as to place machinery there to work the metals. The Cusi-quilachi mines were bought last year by a San Francisco company for \$500,000. These mines are 90 miles from Chihuahua. The veins at the depth of 600 ft. contain solid metal in some cases to the breadth of 15 ft. The metal has been treated by lixiviation. The Batopilas mines in the southwest of the State, of which Messrs. Wells, Fargo & Co. are the owners, contain great deposits of silver and produce large sums to their workers. The archives of the Chihuahua show that these mines produced, during the rule of Spaniards, the vast sum of \$400,000,000. The Parral mines belong to the Knott company, of Chicago. These mines are in the city of Hidalgo. According to the State archives, these mines have yielded \$60,000,000. An Indiana company owns the La Luz mine, which is five miles from the Parral. The Guis, or gravel mines, are owned by the Chicago mining company. These mines, also five miles from the Parral, are famous for having at one time produced an immense *bolsa* (nugget) of virgin silver.

This country produced 4,295,414 tons of pig iron in 1880—a very large increase over previous years.



## MECHANICAL PROGRESS.

## The Strength of Iron at High Temperatures.

A very interesting series of experiments has lately been carried on by Dr. Kollman, on the strength of iron and steel at high temperatures, at the works of the Gutehoffnungshütte, near Oberhausen. Two testing machines were used to determine the resistance of the iron. In one of these machines the load was applied by means of a hydraulic press, and measured by dead weights, acting through a system of levers. The other machine—direct loading was applied to the extension of the test piece, taken up by a screw and hand gear. The machines were checked before every test.

In the tests made, only ordinary iron, as daily produced at the works, was employed. Fibrous iron, fine-grained iron, and Bessemer steel were tested, their relative specific gravity being 7.62, 7.69, and 7.84. The test pieces used were made from blooms reheated once and rolled down. The Bessemer steel pieces were twice reheated. The length of the parallel part of the test piece was 1.38 inches, while a different specimen was used with a parallel length of 2.65. Two short specimens were used at very high temperatures, as the elongation of the long pieces was too great to permit rupture to take place with the range of the lever.

The calorimeter used is a cylinder of thin sheet copper, 3.94 inches in diameter by 11.8 inches high, surrounded by slag wool contained in a wooden case, having a handle. A pocket is provided for the thermometer to prevent its breaking. The thermometer used was a very accurate one, divided into tenths of the centigrade degrees.

The following are the deductions from these experiments: The ordinary temperature at which iron is rolled is determined by careful experiments, and was found to be 2,236° to 2510° F. The temperature at the first pass of the roughing down rolls was 2,264 to 2,217 F. The temperature of the bars delivered from the rolls varied with their section and ranged from 1,382° to 1,760° F. Mild Bessemer steel is also rolled at about the same temperature, as it is so soft and tough that it can stand this heat without burning.

Another important point has also been developed by Dr. Kollman's experiments, that metal which has been raised to a high temperature in a furnace with a reducing flame, is much easier to roll; however, the Siemens furnace, with the gas flues above the ground, is preferred.

A table is given by Dr. Kollman containing the result of 52 experiments, showing the effects of rise of temperature in the reduction of the resistance to rupture and the increase in the contraction of sectional area as well as of the extension. Taking the initial temperature 32° F., and the resistance of iron to rupture at this temperature at 23.81 tons per square inch and calling this breaking load 100, then at a temperature of 200° C., the breaking load is decreased to 22.6 tons or 95% of the load at the initial temperature; at 300° to 21.4 tons or 90%; at 400° to 17.39 tons or 73%; at 500° to 9.14 tons or 38%; at 600° to 4.44 tons or 19%; at 700° to 3.94 tons or 16%; at 800° to 2.54 tons or 11%; at 1,000° to .05 of one ton or 4%; while at 2,250° it broke without the application of any appreciable load. This experiment simply opens the way for other and more elaborate experiments in the same directions. The results are important and we shall look with interest for further developments from our German friends, who are so peculiarly fitted for investigation.—*Engineering.*

**COMPOUND LOCOMOTIVES.**—M. Mallet has recently published additional data on the working of compound locomotives. A locomotive built according to his plans was first exhibited at the Paris exhibition, and some time later he read before the English Institution of Mechanical Engineers a paper describing it and giving particulars as to its working on the Bayonne and Beatty railroad, France. From his latest report it appears that his engines required 3.3 lbs. of fuel per horse power per hour. They weigh full 196 tons, have a small cylinder 9.45 inches in diameter and a large one 15.75 inches in diameter, with a 12.72 inch stroke. The steam pressure is 150 lbs. The quantity of fuel consumed during times of heavy traffic was 13.8 lbs. per train mile. In view of the growing use of high pressure compound stationary engines, these results are of much interest.

**A NEW RAILROAD INVENTION.**—Jeanty Denechand, Sr., ex-Assistant Engineer for the construction of the Southern railroad of France, for many years a resident of this country, has recently obtained a patent for an invention which he designates "The Traveler's Safeguard," and is intended to prevent locomotives, passenger and freight cars from jumping the track. The safeguard consists of a steel or iron arm, with rollers at each end, affixed to car trucks in front and behind, which may be adjusted or removed at will in a very short space of time, by hand or by means of compressed air, as air-brakes are now applied. The inventor, in order to apply his invention, has devised a new style of rail. The rail is a double one, or more properly speaking, a reversible one, so that when one side is worn out it may be renewed, and the other side used.

## Malleable Castings.

Considerable pretense of mystery is assumed by manufacturers of malleable castings, both in this and the old country, and doubtless there are some trade secrets of value to those in the trade, relative to mixtures of different irons, etc.; but the process is in itself simple, and a little experience should enable any foundryman to attain a creditable success in it. Nearly every foundry has its own mixtures and methods, but they are all based upon the processes of Samuel Lucas, of Dronfield, which date back to 1811. The general features of the process, iron as carried out by the Birmingham (England) founders, is given in the *Ironmonger* as follows:

"For the purpose of the casting, pig of a fine quality is needed, and great care is used in the preparation of the molds, so that there may be no flaw or imperfection in the casting. The latter, after cooling, is, of course, hard and brittle, and it is to remove this brittleness, and give it the character of malleable iron, that the special process is required. The casting is now placed in hermetically sealed pots or boxes, surrounded by powdered ore, and subjected, for several days, to intense heat, which, by cementation, gradually softens it, and renders it malleable to the core, when it may be bent or wound into any shape. The annealing process takes, ordinarily, about 10 days. Thus, a pot made up on Tuesday is got up to a white heat about Friday, and this heat is maintained for some 24 hours or more, according to the size or thickness of the article annealed. The fire is then allowed to die down, and, when the mass is cool, the castings are found to be thoroughly annealed and malleable. Scarcely a trade in Birmingham fails to use malleable castings for some purpose or another.

"The introduction of Bessemer steel has somewhat operated against the trade, but there is still a great field for malleable iron founders, in catering for the requirements of the Birmingham gun, harness and engineering trades."

The journal quoted thinks it much to be regretted there is not a more free interchange of ideas and experience among English iron founders, as in this only is there hope that the English trade can keep pace with German and French progress in the art.

## Styles in Architecture.

We submit the following as being worthy of the consideration of American architectural students:

First. "Style implies some dominating influence reflecting the mind of the age in all its works, and therefore presumes a certain unity of character throughout."

Second. "The primary elements of style are constructive, and the design of work should have regard to construction, and consequently to the proper use of materials, prior to the consideration of its ornamental decoration."

Third. "As construction necessarily implies a purpose, utility must have the precedence of decoration."

Fourth. "As construction necessitates a proper consideration of materials, and as each material has its own mode of manipulation, and is wrought by separate and varied processes, design must be bad which implies indiscriminately the same constructive forms or ornamental treatments to materials differing in their nature and application."

Fifth. "As the greater regulates the lesser, the building should determine the style, and all of what it contains of furniture or decoration should conform to its characteristics, and thus there should be a proper uniformity of style throughout, and a subordination of all the inferior objects to one another and to the whole."

—*Builder and Woodworker.*

**FUSIBLE PLUG FOR STEAM BOILERS.**—A new English patent is described as follows: "The plug is made with an upper and a lower portion. The upper portion can be introduced into the water through the lower one, over the furnace. The upper portion is of a hollow, cylindrical form, terminating with a stop end, the end having a cylindrical opening to receive a conical plug, which has a slight projection on its upper side to hold a piece of the fusible metal. Over the first layer of fusible metal is a second layer, which melts below the boiling point of water, and by its agitation keeps the lower layer of metal free from incrustation." If this matter is thoroughly practicable, and we cannot see why it is not, one of the greatest bugbears against the reliability of fusible plugs is certainly removed, and there is no reason why this plug cannot be put in upon the backhead of a tubular boiler, or any other boiler for that matter, by turning an angle in the inner tube so that when the tube was put right side up this low temperature fusible metal shall be at the top.—*Boston Journal of Commerce.*

**STEAM PACKING.**—Mr. Watson, in his *Mechanical News*, says that the best packing he ever used for faced joints, either steam or water, is common drawing paper soaked in oil. After a short time the heat of steam converts it into a substance like parchment, so that it is practically indestructible. It has the advantage of stripping readily from surfaces when it is desired to break a joint.

**CRACKS IN BOILERS.**—A new method of repairing cracks in boilers, invented in Germany, consists in the use of a sort of wedge link—a pair of tapered pine connected with each other in one solid body by a flat wedge.

## SCIENTIFIC PROGRESS.

## New Theory in Regard to Lunar Volcanoes.

M. Faye, according to the *Chronique Industrielle*, recently delivered a lecture at the Sorbonne, in which he criticised the prevalent belief that volcanoes exist on the moon, and offered a theory of his own to account for the objects that have been taken as craters due to volcanic action. Water, he said, is the sole cause of volcanic eruptions. Now, on the moon there is no atmosphere; this is a fact recognized by every one, and it is absolutely confirmed by observation of occultations. Since there is no atmosphere there, of course there can be no water, for the latter would instantly evaporate under such conditions, even did it exist. So, since there is no water in the moon, it follows that there can be no volcanic action and consequently no volcanoes. But there are circular cavities on the moon, nevertheless. What are they then, and how have they been formed? To account for these, M. Faye asked his auditors to imagine a river frozen over from shore to shore. Such being the case, the tides will exert a pressure on the under surface of the ice, and if a hole exist in the latter the water will quickly issue up through it and congeal around its edges. And so each successive outflow will freeze over its predecessors until the successive layers form a marginal ring of some height around the aperture. From this we may get an idea of the alleged lunar volcanoes, which are diametrically opposite to those that exist on earth. The craters of our terrestrial volcanoes, that of Vesuvius particularly, are at the top of high mountains; the craters of the so-called lunar volcanoes are, on the contrary, in the center of low hills. The bottom of terrestrial volcanoes is greatly elevated above the mean level of the surrounding land; that of the alleged lunar ones is deep down beneath the surrounding ground. Terrestrial volcanoes are conical mountains thousands of feet in height, having at their summit a crater some hundreds of feet in depth, while the circular cavities on the moon are wells several thousands of feet deep and surrounded by a sort of curb some hundreds of feet in height. The circular hollow called *Copernicus*, for instance, is 11,000 feet deep, while its marginal hill is only about 2,600 ft. in height. These circular cavities, then, are veritable wells, and they were formed, according to M. Faye, as follows:

At the epoch in which the moon, covered with a thin solid layer, took less than a month to accomplish its revolution around the earth, tides were created on its surface by the latter. The incandescent and liquid mass, covered by a thin coating that might be well compared to an egg shell, was attracted by our planet, and thereby caused to dash up against this solid layer. Now, if we suppose that small orifices were accidentally created in various parts of the still thin crust, the waves formed by the tide would cause some of the molten mass to issue through these apertures, while the surrounding crust would everywhere else resist it. This liquid would flow over the edges of these well holes, and being unprotected against the cold of space would at once solidify. And, as we have just seen in the case of the frozen-over river, at every tide the margin would increase in height by the superposition of new outflows. Finally a moment would come in which the bottom itself would solidify. But this being situated at a great depth, and being protected against external influences, would remain for a short time in a pasty condition. If at such a moment a new flux should take place, the middle of the pasty bottom would be thrust up, and in solidifying would remain considerably elevated in comparison with the surrounding portions of the bottom. Thus may be explained the existence of the peaks which are observed in a large number of these lunar cavities.

Such is an outline of M. Faye's new theory. "If," says the author, "I am asked by what considerations I am led to make known the results of my observations and researches, I answer that I am seeking, first, to banish from science a gross error by proving that these lunar cavities are not volcanoes, for no explosion can take place where there is no explosive material. Then, again, from a geological point of view, I have wished to study in the formation of the moon those phases of the past which may give us an idea of the phases to come. Although the geology of the moon differs completely from that of the earth, this very opposite nature is a valuable element of discussion. It will serve to banish vain theories, and to put in a clearer light the phenomena of which the earth has been the theater."

**PRESERVATION OF THE COLORS OF DRIED PLANTS.**—According to M. Storz, the slow immersion of the fresh plant in a boiling solution of one part of salicylic acid in 600 parts of alcohol, and then shaking off superfluous moisture, previous to pressing in the usual way between blotting paper, will more nearly preserve the natural color than any other method.

**A NEW CHINESE ALPHABET.**—Bishop Eligio Cusi, at Chang-Tong, in China, has invented an alphabet of 33 letters, by which, it is said, all the sounds of the Chinese language can be represented. The characters used by the Chinese number 30,000.

## The Effect of Freezing on Plants.

When frost attacks plants to such an extent that ice is formed in their tissues, says the *Gardener's Chronicle*, it has been observed that the ice does not occur within the bag or cells of which the plant is made up, but outside or between them. The reason of this is probably because the contents of the cells are thicker and denser, and do not freeze so readily as do the thinner and more watery juices in the spaces between the cells. In this manner the essential part of the cell—so far as its life actions are concerned—the thick protoplasm, is less liable to injury. Moreover, as a consequence of the low temperature, the watery part of the cell contents exudes from the interior through the cell walls and there freezes. The expansion which takes place when water freezes, therefore, does not, at least in slight cases, take place within the cell, where it would do mischief by bursting the cell walls, but outside them, where there is more room to expand and less risk of tearing the tissues. When the frost is more severe the tissues do become torn, cracks and fissures occur, the protoplasm is killed, branches fall, leaves wither or rot, and death ensues. But where the injury is less, and especially where the protoplasm is uninjured, when the thaw comes the ice outside the cells becomes melted, and the water, by the power of diffusion, passes once more through the cell wall into its cavity, there to mix again with the more dense protoplasm. It is clear, then, that the danger to plants from frost is proportionate to the water they contain. If they are in an unripe, sappy condition the danger is far greater than if they are comparatively dry and at rest. Tubers and seeds, for instance, are especially adapted to resist cold; and how well they do so has been shown in the case of wheat which germinated at home after having remained throughout the winter in the Arctic regions.

## Heating by Electricity.

We have been much pleased to notice the various comments upon an article in *Scribner's Monthly*. One thing treated of in this article was the fusing disc for cutting iron, and the other was the production of heat by friction for warming water to heat a railway car. The water in this case has to be heated by friction discs, driven at a high rate of speed by some sort of connection with the axles of the railway car. We believe there is a great deal shorter way to heat a railway car or to heat a room. Some months ago a gentleman forwarded to us a model of what he called a "thead pan." We have spent some pleasant hours with it, and recently very much astonished some gentlemen of Boston, who are underwriters and mechanics, and are great on the electric light question. This little arrangement was connected to a dynamo-electric machine of small caliber, and in less than two minutes it was so hot that the gentlemen readily warmed their hands, as from a steam radiator.

Now why cannot something of this sort be attached to a railway car? It can be made of larger or smaller capacity, so as to have one under every seat, or every other seat; they are all connected by a covered copper wire; they would not leak, the water would not freeze up and break the pipes and it requires a great deal less power to generate the electricity than it would to generate heat enough to heat water and then, by secondary radiation, warm the car. There is no reason why houses, offices and factories cannot be warmed by electricity cheaper than by steam. The matter is an actual fact; has been patented, and other patents are now pending. It will not be a strange thing if, within another year, this little apparatus is put into operation. It has only been shown twice, and in each case has been a source of much surprise and gratification to men who are usually considered well up in mechanical and other matters.—*Boston Jour. Com.*

**IRIDIUM FOR ELECTRIC LIGHTS.**—The latest material offered for an incombustible "burner" for the electric light is iridium. Mr. Holland, gold pen-maker of Cincinnati, claims to have discovered a flux by means of which he is able to fuse iridium in an ordinary draught furnace. He casts the metal in any shape desired, and in bars or ingots weighing as much as ten ounces. The metal thus fused and cast defies the file and resists all acids. The only mechanical way of cutting it is by friction with a copper wheel charged with diamond dust or fine corundum. Mr. Holland claims, further, that the cast iridium makes suitable "burners" for the electric light, and that so used the metal is durable without protection from the atmosphere.

**OCCLUSION OF GASES BY METALS.**—M. Dumas finds that not only do iron and silver possess the property of retaining large amounts of gas for an indefinite period, but that aluminum and magnesium also have the same property. For equal weights, magnesium contains a volume twice as great as aluminum; but magnesium is so much lighter than aluminum that it will hold only one and a half times its own volume. Silver seems to prefer oxygen; aluminum and magnesium, hydrogen; each metal appears to have its individual preference.

**THE NEXT TRANSIT OF VENUS.**—The French Academy of Sciences has appointed a commission, under the Presidency of M. Dumas, to make the necessary arrangements for observing the transit of Venus in 1882.











## The Future of Mining.

We take the following from the *Leadville Circular*:

"Statisticians tell us that the total amount of gold and silver in the world is about \$20,000,000,000, of which about one-tenth, or \$2,060,000,000, have been added to the world's supply by the mineral belt of the United States since the discovery of gold in California in 1849. They further state that about one per cent. of the mineral belt of the United States has been explored, leaving 99% unexplored. If this 99% yields as much mineral as, and no more than the 1% already worked, the belt may be expected to yield in all \$203,940,000,000, rather more than 10 times the present total volume of gold and silver known to be in existence.

"How long it will take to dig out this amount of precious metal is of course a conundrum. At our present rate of production, the belt would last 2,500 years. But as geological and mineralogical science improves, and our knowledge of the geography of the belt increases, production will rapidly grow. Mr. Clarence King estimated that within a very few years the production would reach 1,000 millions per annum, at which rate the belt would last 200 years. As soon, however, as it becomes generally known throughout the world that mining in the United States is the most profitable business ever undertaken by man, such large numbers of persons will embark in it that the whole belt will be worked simultaneously, and its productive life be correspondingly shortened.

"If these estimates are any way near the truth, a startling disturbance in prices may be expected at any time. Prices will not wait for the actual production of the precious metal to advance. They always discount the future.

"If the mineral belt of the United States yields within a generation or two only one-tenth what is expected by statisticians as above stated, everything interchangeable for money will probably double in value within ten years. The effect on prices will probably be the same as an enormous issue of irredeemable paper money. We all remember the effect of the issue of about \$2,000,000,000 of paper money during the war—how every one grew rich, and property of all kinds rose 5, 10, 20 and 100-fold in market value. The like result will follow the development of our mines, if they are what geologists say they are. But there will be this difference. When Government ceased to issue paper money, and began to call it in, prices fell, not as rapidly as they had risen, but fell steadily for 12 years, and more men became poor than had grown rich; whereas the advance in prices which will follow a doubling of the world's stock of the precious metals will go on until the world's population doubles, and the consumption of money in enterprise, industry and commerce is twice what it is now.

It is by the light of these considerations that the active speculation which has prevailed in London, Paris and New York for the past year or two must be studied. There are plenty of men in those financial centers who are well aware of the facts above stated. In lifting prices to what seems a giddy height to those who are ignorant of the mineral prospect, they are merely discounting an inevitable future."

**SWANSEA DISTRICT.**—The *Inyo Independent* says: Mr. J. H. Ely has a force of men at work in this district prospecting the claims lately sold by Moran and Luhnke to New York parties. On the Mountain Star mine two shifts of men are at work, and Mr. Ely expects to strike a body of ore in a short time. This mine has a splendid prospect; it is one of the series on the same ledge or belt as the Indiana and Virginia which has produced such rich ores. The Swansea Belle is also reported as showing rich ore in the bottom of the shaft. New discoveries of fine smelting ores have been made a little to the north of the French Flag and Pioneer mines, and on the same belt. There is every evidence that immense bodies of argentiferous lead ore exist in this locality. On the French Flag and Pioneer locations the surface showing is astonishing; ore crops out on every hand in a bewildering manner. Several small shafts have been sunk, covering a width of over 50 ft. on the French Flag, and all in ore. Swansea is waking up, and in our opinion it will not be long before it will come to the front as one of the greatest bullion producing districts in the State.

**LITHOGRAPH STONE.**—The *Kern county Gazette* is informed that a valuable discovery has been made in the Tehachepi country. A Mr. Campbell, an artist, who was traveling in that section some two years since, discovered some stone, which he believed to be valuable, and took specimens, which he sent East for the purpose of having them examined. He finds that it is a superior quality of stone for engraving on, and has taken a claim, with the intention of supplying the market. This stone is very scarce and sells very high. The United States Government probably uses millions of dollars per year in its purchase, which is used in engravings for bonds, currency, stamps, etc.

**EMPIRE.**—The *Free Lance* says: The old Empire mine is working away steadily and with good results. A late clean up at the mill gave a result of \$6,000, the ore yielding about \$25 per ton. All this rock was taken out by hyruters. There are about 80 men working in the mine, nearly all of whom are "tributers." The Empire is the oldest quartz mine alive on this coast, and it will be alive for many years in the future.

## The Ludwig Copper Mine.

The Ludwig copper mine, owned by the Ludwig Copper mining company, is situated in the Walker River range of mountains, Eastern district, and eight miles west of Greenfield; post-office address, Mason Valley.

Mr. Ludwig, who has for eight years been working the mine and taking the ore to Dayton to be made into bluestone, was in Gold Hill the other day, and brought ores and a specimen of the copper as run into bars by the recent three hours' work of the furnace. No purer copper need be asked than is the bar of 200 lbs. brought in. It is 95½% fine, the odd 4½% being iron. While the furnace was in operation it ran but one-half of 1% of copper into the slag, as has since been proved by Chris. James, the Gold Hill assayer.

During the past eight years' work in the mine the richest ore taken out has been bailed to Dayton. This left 4,000 tons on the ore dump, assaying 14½% in copper—or 290 lbs. of copper to the ton. The last quotation of copper in New York was 19½ cents per lb. It used to cost \$300 per car to ship the ore to New York—10 tons to the car. No arrangements have yet been made to ship the bars. Ore, as it comes from the mine, will yield 20% of copper, or 400 lbs. per ton.

The furnace, which will soon be in running order again, will reduce from 35 to 40 tons per day, and will consume from 600 to 700 bushels of charcoal, worth 24 cents per bushel at the mine. Wood is there worth \$9 per cord.

The mine has been opened by a tunnel run in 100 ft., at which point it is 60 ft. below the surface. A shaft or winze has been sunk 100 ft., also an incline to the same level, the incline approaching nearly a perpendicular, being 116 ft. to the 100 ft.

The ledge is 80 ft. between walls, and in some places the pay ore is 32 ft. wide. The west or footwall is spar, the hanging wall quartzite. There are 2,500 ft. in the claim and 1,000 ft. of stope at an average height of 50 ft., all now ready for breasting out the ore.

The mine is four miles west of Jackson's mine. The ore needs no foreign flux. Iron was taken over, but the trial of the furnace demonstrated the fact that the ore contains exactly enough flux in itself.

Capital from Gold Hill has become invested in this business, and it is in the hands of men who are enterprising, energetic and will make a success of copper mining in Nevada if anyone can. In fact the experiment has already been successfully made. It only remains to tighten up the water-jacket of the furnace and go ahead.—*Gold Hill News*.

## The Coming Fuel.

Coke to Supersede Charcoal and Other Fuel for Smelting Purposes.

The burning and manufacture of coal, says the *Eureka Leader*, is one of our most important industries, and furnishes employment to a large class of our people, but it is thought this industry will soon be greatly lessened, if not entirely eradicated, by the importation of coke for use as a smelting fuel. In the early days of Eureka smelting, and even at the present time where the old-fashioned stone furnaces are used, the burning of coke cannot be successfully accomplished. The heat generated from the coke is of so intense a character as to too rapidly burn out the soft fire-rock used in the construction of stone furnaces, and for other reasons it is not as practicable a fuel as charcoal, but in the more improved iron and water-jacket furnaces that are fast superseding the old stone furnaces these objections can not be advanced. In comparison, coke is far the superior of the two fuels. Charcoal is a bulky, variable and unsatisfactory fuel; hard to procure, unwieldy and troublesome to handle, and losing from five to six per cent. in the process of use, while coke is steady and reliable, more intense, does not lose in handling, and it is claimed, gives more satisfactory results in smelting in every way. At present, English coke that comes "the Horn around," a distance of at least 20,000 miles, can be landed in Eureka for \$30 per ton, while the American article transported by rail across the Continent nets \$55 per ton delivered in Eureka. At these rates the use of coke is easily barred on the range, and it cannot become a general fuel until by means of competition the extortionate rates of the C. P. and U. P. roads are lowered, which will surely come before many years. In Colorado, where coke is the standard fuel for smelting, it is delivered for \$6 to \$8 per ton, and there is no doubt that when the several southern trunk lines that are in course of construction across the Continent, are reached by railroad connection from Eureka, it will be landed here at a trifling advance on that price. When that time comes, the profitable working of our immense deposits of low-grade ores is assured, and Eureka will be one of the greatest smelting centers in the world. The connection by rail with the coal fields of southern Utah is only a matter of a little time, and it is not improbable to believe that Eureka will be drawing its fuel from that section inside of six or eight years more.

A DISPATCH from Seattle, W. T., says: "Some little excitement exists here and at Newcastle over lead, gold and silver-bearing quartz, said to have been discovered near the latter place, assaying \$100 to the ton. Up to Saturday evening some 20 claims had been located.

## Cheap Electric Light.

The distinguished Tynesider, Sir Wm. Armstrong, began to use the Swan electric lamps some six or seven weeks ago at his country residence, at Cragside, Rothbury, near Newcastle, and one of the most remarkable facts in his experience with it is that he obtains the motor or mechanical force, which is in due course converted into electricity and eventually into light of brilliant whiteness, without the use of steam engine, or gas engine, or anything of the sort. Of course, he must employ a dynamo-electric machine so as to generate the requisite electricity, but that is set in motion by a six-horse power turbine used as the motor, and which is so disposed close by a neighboring brook as to take advantage of that natural source of power. The turbine and generator are situated about 1,500 yards from the mansion, and, therefore, as the electric circuit has to be completed, a stretch of copper wire of twice that length, or 3,000 yards, has to be used. But after that has been done, and all the lamps are in position and put in circuit, the light for the whole of the house is got for nothing. Now, let us see what the light amounts to. Sir Wm. Armstrong has 45 lamps distributed through his house, but, as he can switch off the current from room to room, he never requires to have more than 37 in light at once, and for that number of lamps six-horse power proves to be amply sufficient, notwithstanding the great length of the conducting wire used, and the dissipation of energy consequent thereon. His library, a room of 33 ft. by 20 ft., with a large recess on one side, is well lighted by eight lamps, four of which are clustered in one globe of ground glass suspended from the ceiling in the recess, while the remainder are distributed singly and in globes in various parts of the room upon vases which were previously used as stands for duplex kerosene lamps. The lighting of the dining room is also effected by the use of eight lamps, six of which are grouped together in one glass shade suspended over the center of the table, the other two being used singly as bracket lamps, one at each side of the room. Twelve overhead lamps are employed to light a picture gallery, which is also used as a drawing room; but when the eight lamps in the dining-room are no longer wanted the current supplying them is switched off to the gallery for lighting eight additional lamps, making 20 in all. Sir William remarks that the gallery is agreeably lighted even with the 12 lamps, while with the full illumination the pictures are seen as distinctly as in daylight. In the passages and stairs the lamps are, for the most part, used without glass shades, and present a very beautiful star-like appearance, not so bright as to pain the eye in passing, and very efficient for lighting the way. The turbine and generator at Cragside are occasionally used in the daytime for the transmission of motive power to a second dynamo-electric machine acting as a motor to drive a sawing machine. It does so with good effect, but Sir Wm. Armstrong is not prepared to say how much of the original power is realized, or what should be the proportions between the generator and the motor to give the best effect.—*Engineering and Building Times*.

**THE CENTENARY OF GEO. STEPHENSON.**—In view of the approach of the hundredth anniversary of the birth of George Stephenson, the eminent railway engineer, who was born on June 9th, 1781, the Amalgamated Society of Railway Servants have started a movement for commemorating the event by a centenary festival, having for its object the benefit of the benevolent institutions established for helping railway servants. A great fete, in aid of the Railway Servants' orphanage, is to take place at the Alexandra Palace, and it is proposed to hold simultaneous celebrations in various parts of the country, having for their object the benefit of the disabled, the aged, the widows and the orphan of railway servants, of all grades, throughout the United Kingdom. It is hoped by the committee that the proposal will meet with universal support, having regard to the great work which Stephenson accomplished, and the vast benefits which the world in general has derived from his inventive genius. Application is to be made to the Lord Mayor of London to head the movement.—*Engineering and Building Times*.

**PLATINUM.**—The only platinum worker in the United States is Joaquin Bishop of Sugartown, Chester county, Pennsylvania. Recently the Association of Mining Engineers made an excursion to the works of Mr. Bishop to see his workings of this intractable metal. Mr. Bishop, who gets most of his supply from the Ural mountains, in Russia, has been working platinum for 40 years. In 1845 he took a premium, but at that time the demand for platinum was so small that it only occupied him one day in the month, using the metal principally for rivets to fasten artificial teeth. Before the engineers, Mr. Bishop melted a piece of platinum with the ease that a plumber melts lead. The intense heat used may be imagined when it is known that a steel file held in the blast burned like a piece of wood. The Russian government used platinum in its coinage until 1864, when about \$2,500,000 worth of platinum coins had been struck.

A NEW YORK mining paper, in speaking of a certain mine, says the superintendent is under the impression he will find better and larger quantities of rich ore as the drift attains greater depth.

## Gas-Lighted Buoys.

The idea of illuminating floating beacons by means of gas appears at first sight to be rather a visionary one. On looking into the matter, however, we shall find that it is not so, nor even an idea at all now, but an accomplished and a practical fact. It is not, however, effected with ordinary coal gas, nor do the ordinary conditions of consumption obtain. The means by which this end is attained are the same as those which have at length rendered efficient railway-carriage lighting possible, namely, Pintsch's oil-gas system. At page 145 of our last volume will be found a full description of this system, and at page 469 are particulars of its most recent application on railways in connection with the London and South-western system. We need only, therefore, now observe that it consists in distilling the refuse of shale oil, or other similar matter, and in storing and using, under considerable pressure, the gas produced from it. If this storage and use can be successfully accomplished on land—and we need hardly say that it not only can be, but is—it should follow that, other things being equal, there can be no difficulty in storing and using it under similar conditions on water. Nor is there any difficulty in this respect, the system having been carefully developed, step by step, from a clever idea into actual practice. The buoy itself is made the recipient for containing the compressed gas, and the lamp, which is mounted on the top, will burn for periods of 6, 9, or 12 weeks, according to size, with one filling, the diameter being 7 ft., 8 ft., and 9 ft. respectively. The buoys are made of wrought iron and of the necessary strength for resisting the internal pressure and the external blows incidental to each objects afloat. The Trinity House has two spherical buoys lighted on Pintsch's system, the gas for which has, up to the present time, been supplied from the Great Eastern railway gas works, at Stratford. Pintsch's system being in use on that line for carriage-lighting. Arrangements are, however, being made with a view to the establishment of a small gas works in connection with the Trinity Board, and it is probable that this plan will shortly be carried out. One of the Trinity House buoys was placed on the East Oaze station, near the Mouse lightship, on the 18th of April last, and remained at its station until the 28th of last month, when it was unfortunately run into and damaged by a passing vessel. The Trinity House report that during that period the light was burning without intermission, although it is stated by the officer in charge of the Mouse light vessel (½ mile distant) that in bad weather the buoy itself was at times hidden from view by the spray of the sea.

At Port Glasgow, the Clyde Lighthouse trustees are building a gas works on Pintsch's system for the service of illuminated buoys on the Clyde. One of these buoys has been burning on the Rossneath Patch for some time past, being supplied with gas from London. A second—a bell buoy—is about to be delivered by Pintsch's Lighting Company for use on the Clyde. This company is also about to dispatch a buoy to Port Said for the use of the Suez canal. This buoy we recently had an opportunity of inspecting, and can testify to the excellence of the light given. It will show a red light day and night for six weeks. The buoy is seven ft. in diameter, and has a capacity of 150 cubic feet. The gas will be stored at a pressure of seven atmospheres, or 105 lbs. per square inch, which give 1,050 cubic feet of gas in the compressed condition. The gas being burned at the rate of seven-tenths of a foot per hour renders this supply available for six weeks. The estimated cost of gas per 24 hours' consumption is 2½d., not a very extravagant cost, it will be admitted. The process of refilling a buoy is merely a matter of a few minutes. The gas is taken to the buoy in a tender, and is passed from the reservoir, or store-tank, by means of a flexible tube into the buoy, where it is stored for consumption at the required pressure. By the adoption of gas works on shore, in the vicinity of the buoys, the whole operation is reduced to a very simple system. From the proved efficiency of these buoys, and the special advantages they offer for making entrances to harbors, river passages, wrecks and the like, there can be but little, if any, doubt of their general adoption for the purposes we have indicated, as well as for others of a cognate character.—*Iron*.

**TIAGA STARTING UP.**—O. H. Brooks, Assistant Superintendent for the Great Sierra mining company, will on Monday next commence work on the company's property, the Mount Dana mine, in Tiaga district, with a force of 15 men. The Mount Dana is one of the largest silver-bearing ledges in the country, carrying an ore vein 62 ft. in width and vein matter to a width of nearly 200 ft. The ore is of high grade, running from \$40 per ton up into the hundreds, with a touch of refractory elements that prevent free milling, but these are readily expelled by the Frue concentrator, a rapid and economical process. The development of this property will doubtless bring Tiaga into prominence as a rich mineral region.

The *Truckee Republican* says it reported that the bonanza firm has made a contract with parties at Reno for 200,000 cords of wood. If this report is true it shows that faith in the future of the Comstock has not died out entirely in the breasts of those chiefly interested.



## Apprenticeship.

A firm of machinists of Springfield, Massachusetts, finding it difficult to get thoroughly qualified workmen, are making an effort to restore a good system of apprenticeship. The *Iron Age* gives an outline of the plan adopted. It is, in effect, an industrial school, most of the time being devoted to practice instead of theory. The apprentices will be required to devote during each week fifty-eight hours to work and nine hours to study. The *Age* says:

The term of apprenticeship for those beginning to learn a trade, who are under 20 years of age, is six years, in which time, under this system, it is believed an apprentice will be qualified to rank with the best journeyman, and to earn the same wages. Those who are over 20 years of age are allowed to finish their apprenticeship in five years, and those who have worked in a shop are advanced according to proficiency. The beginner is first put to drawing from sketches, and then takes up projection and diagrams, and advances regularly according to his ability. It is believed that in this way one year will qualify him as well to work for drawing as four or five years ordinarily. All applicants are taken on trial for from four to twelve weeks, and if not satisfactory they are then dismissed. For the first year's labor five cents per hour is paid; to those under eighteen, six to those who are eighteen, and seven cents to those who are twenty and upward; for the next years these rates are advanced to six, eight, ten, eleven and twelve cents. The firm also pay two cents per hour additional into a reserve fund which is paid to those apprentices who finish their full term of service; for the six years this amounts to \$400.

There are already more applicants for apprenticeship than the firm can accept. Many trades are being left without good workmen, owing to failure to serve an apprenticeship. The Springfield experiment, if found to work well, may be the means of arousing needed attention to this necessity and advantage of boys learning their trades before they start out as journeymen.

**ARIZONA COPPER.**—Messrs. Hyatt, Dunphy & Foa sold yesterday to Messrs. Swift, Christopher & Sevenoake the Apache, Midas and St. Nicholas copper mines, lying on the easterly slope of the Santa Catalinas. The consideration paid was \$50,000. These mines show a large amount of high grade ore, the ledge in one cut being over 15 ft. in width. Fuel and water are abundant in the vicinity. Charcoal can be delivered at the furnaces for 15 cents per bushel. This fact gives these mines a great advantage over the other copper mines of Arizona. The great drawback to successful copper smelting in other districts has been the high price of fuel. At Bisbee charcoal is hard to obtain, and English coke is used in its stead. This coke is \$65 per ton laid down in Bisbee, making the cost of smelting, for fuel alone, of one ton of copper ore amount to \$11. With charcoal at 15 cents per bushel the cost for fuel is about \$5.50 per ton, thus showing a difference of 100 per cent in favor of the Santa Catalina mines as compared with those of Bisbee. Other advantages, such as proximity to the railroad, and good natural roads, exist, and there is no reason why the successes of Bisbee should not be repeated in the Santa Catalina mountains. The new owners are men of energy and capital and the mines will be energetically worked.—*Arizona Mining Journal*.

**A GREAT MINERAL REGION.**—Esmeralda county, Nevada, and Mono and Inyo counties, California, embrace within their limits the most promising mineral region within the United States, and now seem destined within the next eight or ten years to have a population of from 80,000 to 100,000 people, and to add from \$50,000,000 to \$100,000,000 annually to the wealth of the world. There are now 15 organized districts and a vast area of almost unexplored mineral ground within this county. Of these districts, Bodie, Spring, South Bodie, Buckeye, Jordan, Homer, Tioga, Laurel Hill and Mammoth have already made important developments, while most of the others have surface prospects equal to the best of these at the same stage of development.—*Bodie Free Press*.

**WHAT COULD BE DONE.**—The Bodie tunnel and Bechtel could keep 20 stamps supplied with ore for an indefinite period of time; the Con. Pacific and Boston Con. could easily supply 10 stamps; the Concordia and Oro could supply 10; the Belvidere and Jupiter could supply 10; the Goodshaw and Addenda could supply 10; the Bodie 10 and the Standard 50 more stamps than they have, and the Noonday will shortly start 10 additional stamps. The 10 additional in Noonday will increase the aggregate number of stamps in the district to 144, and yet steady employment could be given to 120 more—if the mines named be worked to their full capacity.—*Bodie Press*.

It has come home to the people of the Comstock quite forcibly of late and partly, at least, from the ominous stillness in the market, that "the powers that be" are not at all anxious these days for a boom in stocks or for an unwarranted increase in the value of securities. If they were, Comstock shares are so well held that they could unquestionably secure it. An order to buy a thousand shares of each of the north end stocks would about double the price of them all.

## USEFUL INFORMATION.

**PRESERVATION OF MEAT BY DEXTRINE.**—In the *Comptes Rendus* of the French Academy for December 6th, there is a note by M. J. Seurs on some experiments made by him in drying and preserving meat by means of dextrine. Of the three specimens exhibited before the Academy the first was a slice of lean meat which had been buried in dextrine and left exposed to the air on a shelf in a closet for 20 months. The meat has been mummified; but on putting it in water, it separated from the dextrine and assumed its original physical character. The second was meat which had been chopped up coarsely and mixed without any particular care with dextrine, so as to obtain a thick paste. This paste was dried in this air, and retained its properties like the former. The third was meat beaten to a fine pulp with dextrine and run into a mold, the result being a very hard, dry, homogeneous cake of a handsome appearance. Each of these specimens when exhibited had been preserved for the same length of time—20 months.

**SECURING GLASS IN SKYLIGHTS AND ROOFS.**—A recent English patent shows what seems to us a very convenient and reliable way of fastening sheets of glass in skylight frames of either wood or iron. In the case of a wooden rafter a piece of sheet lead is cut three and one-half times the width of the rafter, laid across the rafter, projecting equally on either side, and nailed at intervals. The lead is then doubled back over the heads of the nails to the center of the rafter on either side and turned up at a right angle. The glass is then laid and the lead, turned down over the face of the glass so that when finished the lead covers the glass the same width of the rafter. If iron is used for a rafter the lead is doubled under the edge of the T instead of nailed, as in the case of wood, and in all other respects handled just the same as with wood.

**TESTING DRAIN PIPES.**—A writer in the *Ironmonger*, from long practical experience in testing drain pipes, confidently recommends for that purpose what he terms a "smoke test;" and which gives evidence as to leaks both to the sight and smell. The materials that he employs are soiled cotton waste and sulphur, the smoke from which, after ignition, is blown into the drain or pipes. If leakage exist in the latter inside of the house the smoke and smell both issue forth and show that something is wrong, and generally tells just where the fault or faults are. Sulphur, as is well known, is one of the best of disinfectants, and a dose of the fumes from this to the drains, after disease has been in the house, would effect much good.

**RUBBER HARNESS.**—Rubber saddle girths are made of gum elastic or other webbing, with a spring of perforated elastic compound, about two inches in length, inserted either about the middle or at either end of the girth. The springs are varied in length, according to the thickness and the width of the web. By the use of this girth the saddle is made more secure from turning, as the girth may be drawn very tight without inconvenience to the horse. Surcingle are made either of woven web or perforated felt, like saddle girths, only about twice their length.

**TO MAKE JAPANESE LACQUER.**—Melt 50 lbs. of Naples asphaltum and 8 lbs. of dark gum anem; boil for about two hours in 12 gallons linseed oil; then melt 10 lbs. of dark gum amber and add driers. Boil for about two hours, or until the mass when cooled can be rolled into little pellets. Withdraw the heat and thin down with 30 gallons turpentine. During the boiling the mass must be constantly stirred to prevent boiling over.

**LUMINOUS PRINTING INK.**—A new invention is reported from Turin. It consists in the application of light-giving materials to printing ink, by which print becomes luminous in the dark, so that in future it will be possible to read at night, in bed or during a journey, without the assistance of candle or lamp. A new daily paper in which this luminous material will be used is, it is said, about to be published at Turin.

**LEGHORN HATS ARE WHITENED** (otherwise than with the fumes of sulphur) as follows: Immerse in a strong aqueous solution of sulphite of soda or bleaching powder (chloride of lime), and then in dilute sulphuric acid (acid 1, water 5). The bleaching powder treatment requires much subsequent washing, or the use of an antichlore dip, hyposulphite of soda dissolved in 20 parts of water.

**CEMENT FOR AN AQUARIUM THAT WILL NOT CRACK OR PEEL FROM GLASS OR GALVANIZED IRON.**—Take by measure, 10 parts of litharge, 10 parts of plaster of Paris, 10 parts of fine, dry white sand, and 1 part finely powdered resin. When wanted for use, mix into a stiff putty with boiled linseed oil. Do not use the tank for three or four days after cemented.

**COTTON AS A BUILDING MATERIAL.**—Even so inflammable a material as cotton can now be used for the construction of fire-proof buildings. It is converted into a paste by chemical treatment, which becomes as hard as stone. It is molded into large slabs and designated as architectural cotton.

**REMEDIES FOR BOILER SCALE.**—The following are a few of the remedies for scale in boilers recommended by various authorities: Potatoes, one-fifth of weight of water, prevents adherence of scale. 2. Twelve parts of salt, 2½ parts of soda, one-eighth extract of oak bark, one-half part of potash. 3. Pieces of oak wood suspended in a boiler and renewed monthly prevent deposits. 4. Two ounces of muriate of ammonia in a boiler twice a week prevents incrustation and decomposes scale. 5. Coating of three parts black lead, 15 of tallow, applied hot to the inside of a boiler every week, prevents scale. 6. Thirteen lbs. of molasses, fed occasionally into an eight-horse boiler, prevented incrustation for six months. 7. Mahogany or oak sawdust in limited quantities. The tannic acid attacks the iron, and should be used with caution. 8. Slippery elm bark has been used with some success. 9. Carbonate of soda. 10. Chloride of tin. 11. Spent tanner's bark. 12. Constant blowing off.

**PHOSPHORESCENT FLOWERS.**—French manufacturers have a very simple method of preparing the phosphorescent flowers, which are commencing to attract so much attention abroad. They are rendered luminous by coating the petals with transparent size, and then dusting them with a phosphorescent substance, such as Canton phosphorus (sulphide of calcium) or Bologna phosphorus (sulphide of borium), the first named being considered the best, and yielding a soft yellow light. According to M. Becquerel, a good quality can be made by mixing 48 parts of flowers of sulphur with 53 parts of calcined oyster shells, and raising them to a temperature of between 800° and 900° C. Exposed to sunlight during the day, the flowers become brightly luminous at night.

**PATINA.**—An imitation of patina for bronze objects of all kinds can be produced by preparing a paint of carbonate of copper and any light alcoholic varnish, and applying it to the object with a brush. This green color penetrates the smallest recesses and has, when dry, the appearance of patina. Carbonate of copper gives a blue patina, verdigris a light green, and intermediate shades of color can be obtained by mixing the two.

**IODINE.**—The best weeds from which to make the ashes for the extraction of iodine are said, by Dr. Thierclain, to be two varieties of the fungus digitaria. He has succeeded in obtaining from the plant 3% of iodine.

## GOOD HEALTH.

## Odor from the Feet.

The odor of pure perspiration is not unpleasant, as may be proved in clean and healthy babies. When, however, the other eliminating organs—those that strain the waste matter from the blood—do not duly perform their functions, their work is attempted by the skin. Then a disagreeable odor is generally given to the perspiration. Even in these cases, the odor is produced mainly after the perspiration has been absorbed by the clothing.

This last fact is generally true of the bad odor which is associated with the excessive perspiration of the feet of some people. Dr. Geo. Thin, of England, has been investigating the matter, and has communicated the results of his experiments to the Royal Society.

The perspiration of the body is generally slightly acid. That in the soles of the stockings and boots he found to be alkaline. In this there is a rapid development of a class of bacteria (microscopic vegetations) characterized by a fetid smell (*bacterium fetidum*). The fluid in the soles of the stockings and of the boots examined by the doctor was found to teem with them. Thus the odor is supposed in some cases to be due, not directly to the perspiration as it comes from the feet, but to its subsequent putrefaction.

The afflicted will be glad to learn that this odor can be wholly destroyed by horacic acid—the acid of boron. The stockings should be changed twice a day. When taken off, they should be placed for some hours in a jar containing a solution of the acid. They are again fit for use after drying.

To prevent the odor from getting into the boots, cork soles should be worn, and placed at night in the jar and dried the next day. Washing the tender and core parts of the feet with the acid will relieve the accompanying feeling of heat and pain.—*Hall's Journal of Health*.

**A LEG AMPUTATED BY ELECTRICITY.**—A very interesting operation was performed in the Toronto General Hospital a few weeks ago. It consisted of amputation, by means of electricity, of the left leg at the hip. The patient, a young man, being reduced very much by the sloughing of an open wound on the outside of the leg, it was desirable that he should lose as little blood as possible. Having placed the patient under the influence of ether, the customary flaps were made, and then a platinum wire, attached to the two poles of a galvanic battery, was encircled round the leg under the flaps. In a moment this wire was brought to a white heat, and began to cut its way through the limb. By the great heat the ends of the arteries were contracted, and only the larger ones required to be tied. Many of the leading surgeons of the city and a large number of the students from both schools were present.

**SUGGESTIONS CONCERNING LONG LIFE.**—If anyone could furnish the world with a medicine which would insure a long life, there is no end to the demand he would have for his drug. The *Herald of Health* thinks he would need many factories to make it, and many banks to hold the money he would receive. Fortunately, there is no such medicine, and so the world will have to get along in some other way. Some time ago the French government sent a circular letter to all the districts of that country to collect information as to those conditions of life which seemed to favor longevity. The replies were very interesting, but on the whole rather monotonous; and the general result is that longevity is promoted by great sobriety, regular labor, especially in the open air, short of excessive fatigue, easy hours, a well-off condition, a philosophical mind in meeting troubles, not too much intellect, and a domestic life. The value of marriage was universally admitted, and long-lived parents were also found an important factor. A healthy climate and good water were mentioned. All this agrees with common sense, unless the idea that the intellect is a hindrance to longevity be considered unreasonable, and we know that some of the most intellectual men have lived to great age.

**SMOKER'S CATARRH.**—Habitual smokers are notoriously liable to colds in the head, and bronchitis and other congestive affections of the air-passages. On this subject Dr. J. F. Rum-bold says: "The congestion occasioned by the action of tobacco on the mucous membrane of the superior portion of the respiratory tract resembles, in many respects, the congestion resulting from the effects of a cold, and, like the effects of a cold, some of its effects are transitory and some are permanent. The local effect of tobacco on the mucous membrane of the nose, throat and ears is as predisposing to catarrhal diseases as inefficient and insufficient clothing in the case of females. The local effect of tobacco on the mucous membrane of the superior portion of the respiratory tract causes a more permanent relaxation and congestion than any known agent. As tobacco depresses the system while it is producing its pleasurable sensation, and as it prepares the mucous membrane by causing a more permanent relaxation and congestion than any known agent—to take on catarrhal inflammation from even slight exposure to cold, it should require no farther evidence to show that its use ought to be discontinued by every catarrhal patient.—*British Medical Journal*.

**NICOTINE POISONING.**—A rather unusual case of poisoning by nicotine has occurred lately in a Paris suburb. The victim, a man in the prime of life, had been cleaning his pipe with a clasp knife; with this he accidentally cut one of his fingers; subsequently, but as the wound was of a trivial nature he paid no heed to it. Five or six hours later, however, the cut finger grew painful and became much swollen; the inflammation rapidly spread to the arm and shoulder, the patient suffering such intense pain that he was obliged to betake himself to bed. Medical assistance was called, and the ordinary remedies proved ineffectual. The sick man, questioned as to the manner in which he cut himself, explained the use to which his pocket knife had been applied, adding that he had omitted to wipe it after cleaning the pipe. The case was now understood, and the patient's estate becoming alarming he was conveyed to the hospital. There the doctors decided amputation of the arm to be the only hope of saving the patient's life, and this was immediately done.

**INFECTION FROM MOSQUITOES.**—The discovery that mosquitoes carry filaria in their probosces, and infect the human subject with that much-dreaded worm parasite, has attracted considerable attention among the English microscopists. The matter has been brought before the Quekett Microscopical Club by Dr. Cobbold, the President, who is one of the highest authorities on this subject. Particulars of various cases were given in which it was proved that those suffering from filaria had received the contagion from mosquitoes, and mosquitoes themselves infected with filaria were shown. Filaria are very minute worm-like parasites, which, on entering the human body, breed until they increase to countless numbers. By recent advices we learn that they have the power of entering and leaving the blood at pleasure; they usually invade the circulation about seven o'clock in the evening, and increase until about midnight, after which time they retire to other parts of the system.

**PETROLEUM IN BRONCHITIS.**—In a communication to the *Gazette des Hospitaux*, Dr. Mouhe gives his experience of petroleum capsules in simple and chronic bronchitis. This balsamic had been brought before the Therapeutic society by Dr. Blache, a year ago, at the suggestion of a Paris chemist, who named it Gabian oil, in order to prevent public prejudice. Each capsule contains twenty-five centigrams of pure petroleum, the ordinary oil not being used, as it has to be distilled in contact with sulphuric acid to render it fit for lighting purposes. It is stated that at the Hospital Beaujon, where these capsules have been freely ordered for chronic bronchitis, a rapid diminution of the secretion and of fits of coughing has been observed; and in tuberculosis, also, the medicine has given encouraging results.



# MINING SCIENTIFIC PRESS

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## The Week.

As spring gradually approaches, the migratory miners begin to think of changing their quarters. They do not, like other migratory animals, all go in one direction at one time, but this year come go north and some south. New Mexico, Arizona and Sonora attract south, and Idaho and Alaska north. New incorporations for working mines in Alaska are becoming numerous.

We mention elsewhere an event which is of interest to the mining community, viz.: the change in the chief of the U. S. Geological Survey.

The Governor has issued a proclamation calling an extra session of the Legislature.

The event of the week in mining circles is the connection of the south branch of the Sutro tunnel and the Yellow Jacket north drift. As soon as the drain boxes are in, the big pumps of the Yellow Jacket will start up and new life will at once be given to all the mines of that part of the Comstock. The Belcher and Crown Point companies may again resume operations on their lower levels, and the Imperial and adjoining companies may begin to do something besides pumping.

It will probably take some time to repair the deepest workings of the Belcher and Crown Point mines, as it is but fair to conclude that there has been more or less caving, but in a few weeks they will doubtless be going ahead as usual.

As for the heat that will be left in the lower levels after the water has been drained off, it will soon pass out, once a free circulation of air has been established. Air blown into the main drifts will greatly assist in the cooling-off process.

## The United States Geological Survey.

Clarence King has resigned his position of Director of the United States Geological Survey, and Major J. W. Powell has been appointed by the President to fill the place.

This action of Mr. King's is somewhat of a surprise to his friends and to the public, in view of the fact that there was so much rivalry between that gentleman and Mr. Hayden to obtain the Directorship, and that so short a time has elapsed since Mr. King was appointed.

It will be recollected that there were formerly three surveys in charge respectively of Capt. Wheeler, Dr. Hayden and Clarence King. Each of these surveys was doing work entirely independent of each other, although they were all employed with pretty much the same objects in view. When it was wisely resolved to consolidate the surveys under one head Mr. King was appointed director, a position he was eminently qualified to fill, by education, experience and choice.

The organization of a work of this character was alone something that required experience. The elaboration of details was necessarily left more or less to subordinates; but a shrewd general management and careful supervision of matters was requisite. Mr. King, in organizing his parties, pursued a different course from what has usually been done. They are made up largely of young men. He concluded that young men would do more work, and he more ambitious to excel than older ones, and that he could train them to do their work in the manner that he wished it.

The parties, under the new order of things, have been in the field for over a year now, but as yet none of the results have been published. Several volumes are in preparation, which will be extremely useful to mining. That Mr. King should give up his work after getting it so well under way, but before the publication of results, seems strange. It is understood, however, that the private business of "experting" is much more lucrative to him than the directorship of the Survey, and that he will again follow his profession of mining engineer.

It is pretty well known that Mr. King nominated his successor, a choice that will be welcome to all who know anything about the Survey. Major Powell is an indefatigable, energetic explorer, with special knowledge and experience fitting him for the task. A very entertaining writer, he possesses a faculty of making interesting reading of facts, which presented by others might be dry and dull. A ready, and really eloquent speaker, by the way, Major Powell can always interest an audience, as he showed when called upon at the Academy of Sciences last year.

It is not probable that the personnel of the survey will be changed to any extent by Major Powell. Mr. King did not choose his associates haphazard, but carefully selected them. In fact there is less of "political preference" exhibited in this survey than in any branch of the public service, and it has already attained an enviable distinction in respect to the gentlemanly character of those connected with it. Major Powell is keenly alive to the interests of science, but will not on that account neglect the more practical points involved in his work. He will no doubt continue the work of collecting facts concerning mining and metallurgy so well commenced by Mr. King, in a thorough manner. Major Powell, like Mr. King, has a hobby, and in this case it is ethnology, but he will not let his enthusiasm in this direction carry him away from the general work of the survey. He was the first one to take a party down the Colorado canyon, and his book describing that trip is one of the most popular of Government reports. He is familiar with Indian manners and customs, and has made a study of the red men and their languages. Altogether the people may congratulate themselves on the excellent choice that has been made for director of this survey.

**A HUGE DOCUMENT.**—Messrs. Belcher, Mastick & Belcher, attorneys for intervenor, in the case of Pacific Mining Co. against Empire Mining Co., recently decided in the Superior Court of this county, in favor of plaintiff for \$71,000, have just filed their statement on appeal. It is by far the most voluminous document of the kind ever filed in the law courts of this county. It consists of four volumes, substantially bound in two books, the whole embracing about 2,500 pages, partly written and partly printed. The intervenor, which is the Merchants' Exchange Bank of San Francisco, propose contesting the judgment before the Supreme Court, and the volume filed embrace the points upon which they rely for a reversal of the judgment. The statement is subject to amendment by the opposite counsel, after which it has to be settled and allowed by the Court.—*Amador Ledger.*

At a recent annual meeting of the Chollar mining company, 32,000 shares were represented, and the old Trustees were retained. At the organization of the Board, the old officers were re-elected as follows: A. K. P. Harmon, President; C. L. Weller, Vice-President; W. E. Dean, Secretary; Isaac L. Requa, Superintendent. The total receipts for the year, including \$23,600 cash at the beginning, were \$144,100. The disbursements were \$113,500, leaving \$30,600 cash on hand at the close of the last fiscal year.

## Academy of Sciences.

The meeting of the Academy was held on Monday evening, Professor Davidson in the chair.

Capt. R. W. Simpson made an interesting statement detailing his efforts to acclimatize the *Zizania aquatica* or wild rice, which grows so plentiful in some ponds, lakes and rivers of Canada, extending north to Mackenzie river nearly to within the Arctic circle. It grows annually from seed, and induces the presence of enormous flocks of wild fowl in the autumn, who visit these rice lakes and extensive bays for food. At Lake Eris, it grows in water six to eight ft. deep, and millions of reed-birds, as well as ducks and other water fowl, resort there, and afford very fine shooting. Sportsmen's clubs East are taking means to extend its growth, as it attracts game of all kinds. In Rice lake, where it grows prolifically, it has been cut before seed-time, by manufacturers, who find its fiber, taken from the under surface of the water to a depth of six or seven ft., to be very valuable. It affords the strongest kind of fiber known for making bank-note parchment paper. The Canadian government are now trying to cultivate and stimulate its growth all over the inland waters of the Dominion. Two friends of Capt. Simpson's have each sown 30 bushels of this rice seed, in Wales pond, in Maine, and he desires to call attention to it, as an element likely to prove very useful in improving the shooting in our State, and as such, capable of contributing largely to increase our food supply. Different varieties of it are known, but they all belong to one single species, varying according to climate and location. Capt. Simpson had tried to make it grow in Oregon and California but had failed. He now learned that the seed needed first to be soaked in luke-warm water.

## Grape Rot and Grape Pests.

Dr. H. W. Harkness presented some grape pests, found in the eastern part of Sacramento county, which affects the vines, and he thought induced the grape rot. Its spores grow in autumn and are discharged in March. These are followed by a second generation of *aspharia*, which, in some mysterious way, proves to be coincident with the appearance of the grape rot. Each receptacle contains enormous quantities of spores, not one in a thousand of which seems likely to find conditions such as are necessary to its mature development.

## Earth Fungus as Food.

Dr. Harkness then exhibited colored drawings of a new species of earth fungus, first discovered in Golden Gate park by Mrs. Dr. Mary Curran, if to be had in quantity, would prove a valuable article of food. He called it the *Ocaviana*. Its spores are distributed under ground, in the same manner as those of the famous luxury called truffles. He said he had hunted annually for 15 years under the small oak groves of California, hoping to discover truffles, which in Paris are eagerly sought after as a great delicacy, and sell readily there at \$4 a pound. French ecientists with whom he has conversed assure him that our State has conditions which convince them that they will undoubtedly be found here, when a large number of observers are trained to hunt for them systematically. In Europe they are often rooted up by hogs, who are very fond of them, and have a remarkable faculty of finding them. They grow just under the surface, within four or five ft. of oak trees, in fields, and are highly esteemed by epicures the world over. Mr. Clayton, now in Sonoma, once found some red truffles, not the genuine variety, but a very good article of food, and a fair substitute, among the foothills around Santa Clara, and off a little from San Jose. He had himself dug up some interesting earth puff-balls at Roseburg, and found them edible and quite good for a fungus. Feeling confident that truffles exist on our coast, he recommended farmers engaged in grubbing around oaks, to hunt for them especially, and try and recognize them, for thus they could add a new industry to our State, and increase the value of their farms. Capt. Simpson recommended hunting among the heavy oak forests of Oregon and Willamette valley.

## Fungoid Parasite.

Dr. H. Herman Behr then read a paper detailing his observations on a fungoid growth affecting the roots of grape vines, which had suffered from phylloxera. Dr. Harkness has found this same parasite on the orange and oak trees. It is only found on the roots of grape vines which have been punctured by the phylloxera, whose attack appears to prepare the vine for the development of this fungoid parasite. The invading fungus destroys the insect pest, and vines live about three years afterward, bearing fruit somewhat. Dr. Behr thought that the wild grape vines having deeper roots, with greater natural vitality and recuperative energy than cultivated ones, were rarely, if ever, killed outright by the phylloxera. The habits and conditions necessary to develop the winged phylloxera are little known. Never attempt to clean up infected vineyards by pulling the vines out of the earth and inspecting them, as thus you only aid in spreading the pest, which has been distributed by birds among whose feathers they have been found. Prof. Davidson gave notice that he had two 25-ft. pendulums, in the hands of instrument makers, being adjusted, and that in one or two meetings he would have them hung in the Academy's hall, and he would use them to illustrate the effect of the rotation of the earth.

## The Mechanic's Fair.

The Board of Directors of the Mechanics' Institute held a meeting on Tuesday evening of this week, President Cornwall in the chair. After a lengthy discussion it was unanimously resolved to hold an exhibition at the Pavilion this year, commencing on the 2d of August and closing on September 3d. This is expected to be the last exhibition to be held in the present building.

It was resolved not to offer any premiums for exhibits. This, however, was subsequently modified, so as to allow of the offering of one premium—an institute's gold medal for the California invention which shall be decided by a committee to be the most useful to the greatest number of people.

Mr. Gilmors, who has hitherto superintended the different exhibitions, was appointed Superintendent. He will shortly issue a circular, giving full information relative to the fair.

Mr. Culver will be the Secretary. The gentlemen under whose management the fair will be held are: P. B. Cornwall, President; Vice-President, Starbird; Treasurer, J. A. Bauer; James Drury, George Spaulding, George Hopps, Asa R. Wells and Messrs. Spiers, Fretwell, Wilcox, Dinsmore, Gray and Waterhouse.

In announcing thus early the date of the exhibition, ample time is given to all persons to prepare an exhibit. It is to be hoped that our manufacturers will this year be prompt in coming forward, and will vie with each other in efforts to make the most creditable display.

It will be a great satisfaction to the people of this city to see represented at this fair all the various kinds of manufactures carried on here. We all recognize the fact that we have not manufactures enough for so large a city, yet there are more of them here than most people imagine. Were each industry of the city to be well represented, people could see what our capacities were, and it would encourage others to establish new industries.

Were it not for these fairs held under the auspices of the Mechanics' Institute, half of our industries would scarcely be known outside of business circles. They give an opportunity each year for our manufacturers to exhibit to their customers what progress has been made in their particular branch, and to display their goods in an attractive way to the people who purchase them. We hope that this exhibition will be all that is hoped for, and in order that it shall be, earnestly urge upon intending exhibitors speedy and careful preparation.

## An Oscillating Concentrator.

Joseph Snyder, of Nevada county, is having made at Joshua Hendy's, in this city, one of the oscillating concentrators similar to that which he has at work at the Godfrey mine. The new one will, however, be much superior in construction, and will be exhibited in operation as soon as completed. The machine has a slow, oscillating motion, with no jar. There is no limit to its work, as it can be made of any desired size, large or small. Another feature is that it can be used in connection with undercurrents in gravel mines. The editor of the Grass Valley *Tidings*, who has seen the machine at work at the Godfrey mine, beyond Alta Hill, believes it is destined to work a revolution in the saving of sulphurets and black sand, together with floating amalgam and gold.

The concentrator is thus described by the *Union*: Within a wooden framework about nine ft. in length, by six in width and six in height, are placed, one above the other, two wide wooden platforms, having a slight inclination from their outer ends toward the center. These platforms are so geared by machinery that as the water is turned on, they have a slow, rocking motion, which causes the tailings that are poured in by a sluice on the upper platform, to spread out and run in a thin sheet, backward and forward, and as the sands are the lightest, they gradually discharge over the ends of the platform, while the black sands or sulphurets settle to the center or lowest point, and are discharged slowly through holes on to the lower platform. By the time the tailings reach the lower platform they are nearly freed from the sands, and the black sand and sulphurets, when again discharged through the holes in the center of the lower platform, are received into a box almost as entirely free from sand and tailings, only a trace being seen. It is impossible to describe the various attachments of the machine that conduct its working, but they are all simple and will so regulate the operations as to make the platforms rock at the desired speed, which should not be more than four oscillations per minute. The machine is driven by a small stream of water, but little power being required, and is entirely automatic in its working, and requires no attention whatever, unless it would an occasional inspection to see that nothing was out of order. The present machine takes all the tailings from two 4-stamp batteries, which run through from 50 to 60 tons of gravel daily, and it is estimated that it would do the same service for three 5-stamp quartz batteries.

The Enreka Con. dividend of \$25,000 was paid this week.



## Adverse Claims and Mineral Surveyors.

In this State and elsewhere a species of black-mailing has prevailed to a certain extent under the provisions contained in Section 7, of the mining act of May 10, 1872, relative to adverse claims, or more particularly under Regulation 49 of Mining Laws and Regulations (Coppe's U. S. Mining Decisions, page 235), which permits U. S. deputy mineral surveyors to survey an adverse claim, and certify to the correctness of the plat, to be filed by the adverse claimant. No matter if the record of location was vague and indefinite, it was enough for the purpose of the adverse claimant if he could secure an adverse survey, file his plat in the land office, and through the threatened delay in proceedings, receive a bonus from the parties claimed to be adverse to him.

In one instance, a piece of mining property was on the eve of being bonded while application for patent was pending. An adverse claim was filed, and the owners, rather than submit to the delay of proceedings attending an adjudication of the case, paid the adverse claimant the sum of \$5,000 to withdraw his claim.

This evil was growing and working hardship in many cases, it being in the power of unscrupulous individuals to levy blackmail frequently, where they had no shadow of right to the ground claimed. Theodore Wagner, the Surveyor General of this State, believing that the U. S. deputy surveyors of the district are under his control, and have no authority to act officially except upon direct instructions from the Surveyor General; and believing also that the provisions of the instructions of Nov. 20, 1873, respecting locations, are applicable as well to locations and surveys of adverse claims as to claims for which patent is sought, instructed his deputies to make no surveys, as U. S. deputy mineral surveyors, unless so ordered by him. It was, however, represented to him that such a rule would, in many instances, work as a hardship to bona fide adverse claimants by preventing the filing of their maps in the time allowed by law, especially where the claims were located in remote localities, and he modified the rule, and issued a circular to surveyors to the following effect:

"When an adverse claimant desires a survey of his adverse claim, he must present to some United States deputy mineral surveyor an affidavit substantially in the form herewith inclosed, together with a record of his adverse claim or location.

"The provisions of the special instructions dated Nov. 22, 1879, respecting locations, are applicable as well to surveys to adverse claims as to claims which are sought to be patented. An adverse claim too indefinitely located to entitle it to a survey for patent is not entitled to a survey as an adverse claim.

"The deputy, after making the survey of the adverse claim, will return said survey with the affidavit, diagram, record of location, or, in the absence of a record, secondary evidence of the location to this office, in duplicate, for examination and approval. One copy will be retained in this office and the other copy, if approved, will be sent to the adverse claimant to be filed with his protest in the United States Land Office."

The following is the form of application required from the adverse claimant:

\_\_\_\_\_, being duly sworn, says, that he is a citizen of the United States, over the age of 21 years (or has declared his intention to become a citizen of the United States); that on the \_\_\_\_\_ day of \_\_\_\_\_, A. D. 18\_\_\_\_, \_\_\_\_\_ located a certain mining claim known as the \_\_\_\_\_ mine, and situated upon \_\_\_\_\_ surveyed lands of the United States; that said locator was a citizen of the United States (or had declared his intention to become a citizen of the United States) at the time he made said location; that said claim was located after the discovery of a vein or lode within the limits thereof; that said location was so distinctly marked upon the ground that its boundaries can be readily traced; that the record of said location contains the name of the locator, the date of the location, and such a description thereof as will identify the claim; that said \_\_\_\_\_ is now in possession of said mine, and that a portion of the ground included within the boundaries and forming a part of said mine as located by said \_\_\_\_\_, is included in the official survey of the \_\_\_\_\_ mine, claimed by \_\_\_\_\_, now being published under the provisions of chapter VI, title 32, of the Revised Statutes of the United States.

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, A. D. 18\_\_\_\_.

United States Deputy Mineral Surveyor:

SIR: I, \_\_\_\_\_, claimant of the mine mentioned in the foregoing affidavit, do hereby apply to you for a survey of said location and a diagram showing the conflict between said location and the official survey of the \_\_\_\_\_ mine referred to in said affidavit.

\_\_\_\_\_, Claimant.

Since the adoption of this rule, it has been found that many of the so-called adverse surveys were based upon no foundation whatever; that the records of location were so indefinite that the claims could be swung around to any point of the compass and made to overlap any claim coming within several hundred feet of the center of its "lode line," the direction of the lode line being determined by the location of the mine to which it was "adverse." The

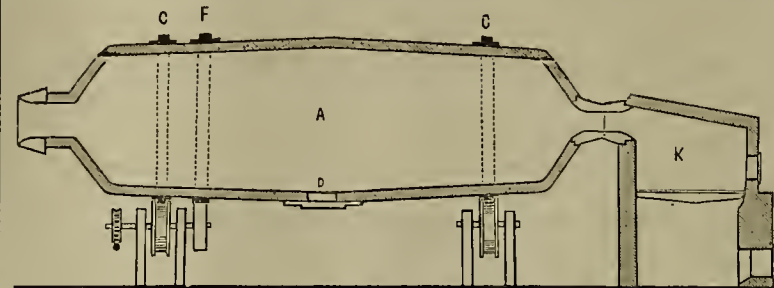
deputy making the adverse survey files his survey in the Surveyor General's office in duplicate. It is carefully examined, and, if found correct and based on a sufficiently definite location, is sent to the claimant; the duplicate is retained in the office for filing with the papers in the case of the claim to which it is adverse. Heretofore no record of adverse survey has been kept in the Surveyor General's office, although the necessity of such a record is manifest. The rule has shown itself to be an excellent one.

Section 7 of the act of May 10, 1872, provides that "it shall be the duty of the adverse claimant, within 30 days after filing his claim, to commence proceedings in a court of competent jurisdiction, to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment, and a failure to do so will be a waiver of his adverse claim. After such judgment shall have been rendered, the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment-roll with the register of the land office, together with the certificate of the Surveyor General that the requisite amount of labor has been expended, or improvements made thereon, and the description required in other cases," etc.

The requirements that the application must be accompanied by the certificate of the Surveyor General as to amount of labor performed, and the description required in other cases, and in fact all the provisions of the act of May 10, 1872, relating to adverse surveys, point to the supervision of the Surveyor General over adverse as well as other surveys.

## The Miners' Trouble at Silver Reef.

The strike at Silver Reef, Utah, still continues, though the miners have, according to the Salt Lake Tribune, lost \$75,000, and damaged the mines as much more. Much property has been lost by the water flooding the mines. The



THE TAYLOR &amp; BRUNTON REVOLVING CYLINDER FURNACE.

pumps in the Savage shaft (Stormont company) are under water, and cannot be removed from the mine until new machinery has been procured. The Miners' Union is receiving assistance from other unions, and the companies express themselves as being fully determined not to accede to the laborers' demand.

A few weeks ago the miners ordered Col. Allen, Supt. of the Stormont, out of town. This gentleman was interviewed by a Herald reporter on his arrival in Salt Lake, and he accounts for their turning him out as follows: "You see, Gen. Ogden, Supt. of the Barbee & Walker, had also given notice that that company's works would shut down on the 1st of the present month, and remain closed down until such time as the reduced rate of wages should be accepted. I charged the miners with having taken this step for the purpose of preventing this action of the Barbee & Walker company. The reply was, 'If he does close down, we shall serve him the same as we are now serving you, and he, probably, will not fare as well as you are doing.' The fact that the mine was not closed down on the 1st instant is evidence to me that the management considers it good policy to keep quietly at work for the present, or until such time as ample security to life and property is afforded in the district."

The miners have been leaving the camp for other districts. Business is at a standstill, and no one presumes to say when work will begin. We notice by the Tribune of the 18th that about 20 miners have been arrested, but no reason is given.

The action of the miners in driving out the superintendent was injudicious, as he was of course only acting for the company, and it looks too much like "Melly Maguirism" to be countenanced by people of this coast. The owners of mines insist that at the rate of wages demanded, and heretofore paid, the mines will have to close. As the wages are higher than anywhere else in Utah the miners could have better afforded to lose the half dollar a day than to stop work altogether. Commodore Ogden, of the Barbee & Walker, is still at the camp, and does not propose to leave it. It is pretty certain he will look out for the interests of his company without fear or favor. It is to be hoped an amicable arrangement will be made shortly, as disputes of that kind are injurious to both parties.

The Hite gold mine, Mariposa county, Cal., has been worked for about 15 years, has produced some \$3,000,000, and disbursed in dividends about \$1,500,000.

## Revolving Cylinder Furnace.

EDITORS PRESS:—We see mentioned in the Press of Feb. 26th, a device adopted by Mr. Ottokar Hoffman, to equalize the heat, time of roasting, etc., at opposite ends of a revolving cylinder for ore chloridizing. We have known for some years the fact of unequal heating in different parts of such cylinders. The old Bruckner patent tried to cure this defect by shifting the ore from end to end in the roaster.

In a cylinder 12'x46' internal dimensions, the heat in the extreme front or firing end is about twice as great as in the extreme back end, but also in the center of the furnace it is three times as great as in the back end. The fires at both ends will not affect the proportion of heat in the center, but will leave this part 50% hotter than either end.

After many experiments we have not been able to find any way of getting the heat equal throughout the cylinder, but found a very simple method of counterbalancing the inevitable unequal heat and obtaining equal results in all points of the roaster by opposing to the unequal heats proportionally unequal quantities of ore. To do this we change the straight line of the side of the ordinary cylinder into a parabolic curve, thus giving a cylinder at any point a diameter which allows it to contain at the place of such diameter, an amount of ore proportionate to the heat developed at the same place. The resultant cylinder is roughly egg-shaped.

These roasters are made by Messrs. Prescott, Scott & Co. of San Francisco, and will give equal chlorination in all parts of their interior and no lumps. Yours truly,

TAYLOR & BRUNTON.

Leadville, Col., March 12th.

Since receiving the above letter we have prepared an engraving of the furnace referred to, and herewith present it. A represents a roasting cylinder for roasting gold, silver and cop-

per ores. The internal diameter of this cylinder is greater at the center than it is at the two ends, as shown. The discharging door is situated in the center at broadest part of the furnace.

The cylinder is intended to revolve, and for this purpose the traveling rings, C, are secured on the outer surface of the cylinder, and rest on the truck wheels, on which the cylinder revolves. D is the opening for charging.

To give the cylinder motion, power is applied to the pulley on the shaft which revolves an actuating screw on the same shaft. This actuating screw meshes with a worm-wheel on a shaft, and as the screw-wheel is on the same shaft, it is also revolved. The spur-wheel engages with the cog on the gear-wheel, F, on the outside of the cylinder, the cylinder thus being rotated. Self-keyed fire brick, held in place by wedge-shaped rings or clamps, which in turn are held in place by set screws, hold the throat lining in place. To remove the throat brick, the set screws are unscrewed and the wedge-shaped rings removed, when the bricks may be separately removed.

COMSTOCK HOISTING WORKS.—A San Francisco stock paper recently asserted that there were only eight hoisting works on the Comstock in operation. This, says the Enterprise, is a mistake. There are at least 25 hoisting works here where hoisting of some kind is being done. Here is the list: Original Keystone, Utah, Sierra Nevada, Union shaft, Andes, Scorpion, C. and C. shaft, Oshiston shaft, Savage, Hale & Norcross, Combination shaft, Bullion, (formerly the Ward shaft), Imperial, Yellow Jacket, Crown Point, Kentucky, New York, Belcher air shaft, Belcher old works, Overman, Caledonia, Forman shaft, Alta, Silver Hill and Sierra (Devil's Gate). To be sure, at some of them very little is being done, but the works are not shut down. In addition, the pumps and air compressors at the Ophir are kept going.

COPPER IN LIVERPOOL.—We see by Jas. Lewis & Sons report on ores and metals for March, that the market for Chile has been steady, with moderate business. The arrivals during the month of February have been 3,249 tons from Chile and from other countries 2,317 tons and 1,677 tons. Latest quotations are as follows: Good ordinary brands, £61 5s, and £61 10s. Ore, 12s 7½d, and regulus 12s 9d per unit. Stocks of West Coast produce are 32,835 tons fine, against 31,340 tons on the 1st ult.

QUICKSILVER has advanced in Liverpool to 18s per flask,

## Wood River.

Probably no other mining center is at present attracting so much attention as the Wood River range, where there are three different districts. Hundreds of men are preparing to go to Wood River in the spring, and some have already—very foolishly—started, although the snow is yet deep. The interest in this new section of country is widespread, and information concerning it is eagerly sought. As regards the ores an exchange tells us that their character varies in the three districts. There are found cake, galena and carbonates, carrying 60% to 70% lead—sulphurates and antimonial silver running into the thousands. Further up the range the mineral is found in calcareous shale, spar, iron and quartz. All the districts have developed paying mines. The whole region is well watered by Big and Little Wood rivers, fed by streams from every canyon and mountain gorge. The water power is sufficient for mills and mining; the mountains well wooded with forests of red fir and black pine, spruce, etc. This is the country the Bannock Indians fought for several years ago, claiming it as a hunting ground. It is full of game of all kinds—elk, deer, antelope, bear and the lesser spoils of the hunt, grouse and prairie chickens, while beaver, otter and mink abound. The smaller streams are filled with mountain trout, while the river has a seemingly inexhaustible stock of the larger trout. Warm springs are found every few miles. Owing to the elevation—5,500 ft.—agriculture may not prove practicable, but the numerous valleys of the mountains and camas prairies to the southwest furnish the finest grazing country in the world—hunch grass thick as it can grow, and innumerable streams in every direction.

Mr. George L. Lucas, of Albion, Cassia county, Idaho, writes to Mr. Delavan, of Virginia City, Nev. (and the letter is published in the Enterprise), to the effect that at Belleville all provisions and supplies were dear. Irish potatoes, \$5 per 100 lbs.; flour, \$7; oats and barley, \$6, and all else in the same proportion.

This winter has demonstrated that the only practical route is to leave the Central Pacific railroad at Kelton, Utah, thence go by stage or wagon to Albion, Cassia county (called formerly Marsh Basin), thence to Goose Creek, to Bellevue, to Ketchum, to Galena, and thence to Saw Tooth, on Big Wood river.

There will be a large emigration to all those places, as well as to Haleyville, now called Marshall, a new town on the east bank of Wood river, opposite the mouth of Croy's gulch, where a bridge has been built. This bridge gives access to a region in which are many of the best mines, without danger of mishaps from high water, for it is a truth that all the mountain streams are swift and very dangerous to ford when the water is high.

From Goose Creek Haley & Co. have a contract for six mails each way every week, to run four-horse coaches, and are stocking the road for that purpose. In a few days there will be another road open (said to be shorter and better) from this point, crossing Snake river at Goodwin's bend. The ferries at what is called the Goose Creek crossing of Snake river and at Goodwin's, both have steel cables, making them much safer than when an ordinary rope is used.

Mr. Lucas tells Mr. Delavan to caution all his friends to prepare (if going by team) to take water for at least one dry camp, for there is no water fit for man to drink between Snake river and Little Cottonwood river, a distance of about 50 miles.

It is 60 miles from Ketchum to Albion, thence 18 miles to the Goose Creek ferry (Snake river), 60 miles to Little Wood river, 15 miles to Big Cottonwood (on Big Wood river), 25 to Bellevue, 16 to Ketchum, 25 to Galena, and thence 12 miles to Saw Tooth. Men can go from Kelton to Galena in public conveyances after the snow goes off.

HALE & NORCROSS.—The Hale & Norcross ran its pumps yesterday till 12 m., at which time the clack of the lower pump at the C. N. S. shaft was replaced and pumping there resumed. The Hale & Norcross then resumed the work of putting in pipe from the first to eighth station, which was completed to-day. Work was to be resumed north in the lateral drifts on the 2100 and 2400 levels immediately, or as soon as the hot air in the mine was blown out a little. It was so hot in the depths Sunday night when it became necessary to rig up the pumps, that one man gave out and was left at the C. N. S. shaft, and another got cramps in his hands—a singular effect for heat to produce, especially when, as in this instance, no change in their appearance was noticeable.—Gold Hill News, March 15th.

The Clear Creek ditch property, Shasta county, was sold last week for \$39,379 to Mrs. Georgie S. Jones. The property was sold at sheriff's sale. The main ditch, which takes water from Clear Creek at or near the Towerhouse, and leading to Mule Town, Horse Town, Texas Springs and other places, with its water rights and branches, brought \$30,000. The Halvey ranch brought \$500; the Elmore ranch \$2,227; the Reese mine \$1,500. A number of other small ditches were included in the purchase, the same lady buying it all.

ANTIMONY is selling in Liverpool at £62 to £64 per ton for French star regulus.



### Pahrnatagat to the Front.

Within the past few weeks an enterprise has been quietly inaugurated and vigorously pushed to a successful termination in this district, that is morally certain to prove productive of most important financial results to the entire section. Notwithstanding the inclemency of a severe winter, the stagnation of mining affairs on every side (and the approaching conjunction of the planets), a trio of our practical mining fellow-citizens have, within 60 days from the first inception of the enterprise, erected, and now have in practical operation, a solid, substantial five-stamp mill (with capacity for 10), with self-feeder and all modern improvements; and now, at "Springer's spring," where less than two months since the coyote's mournful howl alone woke the slumbering echo, five heavy stamps are pulverizing the rich ores of the district, pouring its hitherto latent business into the lap of commerce, and thundering defiance to hard times. Mr. Henry Raymond, so well-known in mining circles, and whose name connected with mining affairs, is synonymous with success, heads the enterprise. Perhaps, in the history of mining in eastern Nevada, considering the many obstacles to be surmounted, and the rapidity with which operations have been pushed in this enterprise, there has been no parallel, and to a very great extent this has been due to the mechanical skill and indomitable energy of Mr. Jas. Ryan, whose services Mr. Raymond was very fortunate in securing, and his able assistant, Mr. John Steele. Pahrnatagat rejoices over its new mill. The thunder of its stamps is music in our ear. We are proud of Henry Raymond and his partners, projectors of the enterprise; we are proud of Jimmy Ryan, chief of construction, and of all who have contributed in any degree to its erection. We are proud from the very nature of the enterprise itself. There has been no fuss, and no feathers. It was heralded in by no blasts of trumpets. No metalliferous frauds sojourn to the far East to seduce hoarded shekels from reluctant capital, and no San Francisco chambermaid by hypothecating her clothing to pay assessments. The first "blowing" in connection with this affair was the blowing of the whistle, and the only "music," the music of the stamps; and last, but not least, we have an abundance of ore to keep it going.

It is rumored that Messrs. Chaffee & Sprague are about placing a saw-mill among the big trees of Irish mountain.—*Pioche Record*.

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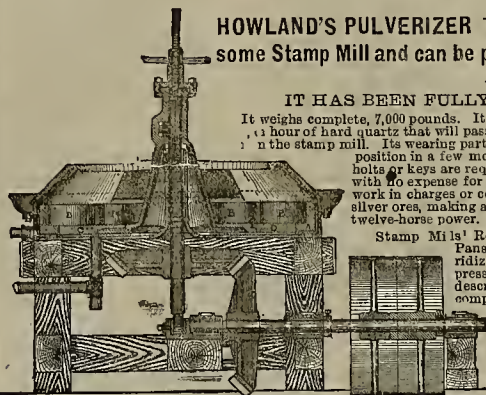
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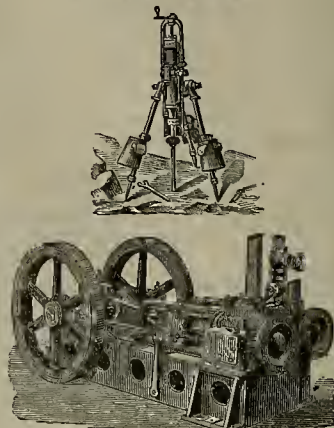
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coast, and judging from what has appeared in the "Quarterly  
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**CALIFORNIA ARCHITECT AND BUILDING REVIEW**  
will be worthy of generous support and encouragement. We  
therefore pledge our cordial sympathies, personally, and hope that  
the enterprise will receive kindly recognition and liberal  
support from all Architects and Builders and the public gen-  
erally. (Signed) David Farquharson, Wright & Sanders, S.  
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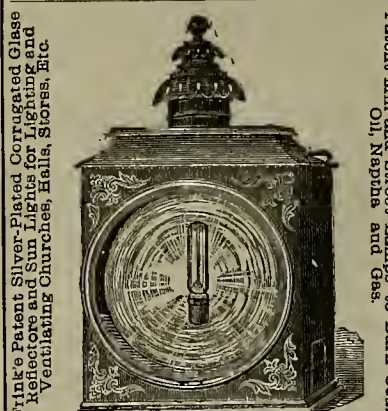
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are covered with body Brussels carpet, and all of the furniture  
is made of solid black walnut. Each bed has a spring mat-  
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING MARCH 25th, 1881.

239,637.—BLUE-STONING WHEAT.—J. W. Blevin, Yuba, Cal.

238,495.—TABLE.—T. Erdin, S. F.

238,674.—LEBRICATOR.—J. Gates, Portland, Oregon.

238,687.—LEVEL.—H. Hobson, S. F.

238,510.—HARVESTER.—W. J. Little, Stockton, Cal.

238,712.—DRILL ATTACHMENT.—C. P. Purinton, Oakland, Cal.

238,719.—STRAW-CARRIER.—J. S. Scott, San Jose, Cal.

238,534.—BOOT.—L. Slessinger, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**WINDOW SCREEN.**—John Reardon, Ione City, Cal. This invention consists of a screen, of any suitable material, secured within a metallic frame, which is adapted to slide upon flanged guides secured to the casings so that the screen may move close to the sash, and move through the entire space, from the top to the bottom, of the window-opening, and so that it may be used as a screen at either the top or bottom of said opening, in combination with laterally-sliding, adjustable guide-pieces and holding-ecrewe, by means of which the screen is made to fit window frames of different widths, the limits to whose dimensions are determined by the length of the slot.

**STRAW-CARRIER ATTACHMENT FOR SEPARATING GRAIN FROM STRAW.**—Jasper S. Scott, San Jose, Cal. This invention relates to certain improvements in devices for separating grain from the straw with which it is mixed and entangled after it leaves the threshing-cylinder and passes up the grain-belt to the straw-carrier; and it consists of a series of vibrating bars having lifting fingers. These bars are set, one just at the lower end of the straw-carrier and the other two beyond its outer end, and they are all caused to oscillate by means of crank-arms, so as to separate the remaining grain from the straw before it passes over the tail-board and is discharged.

**BAKE MILL.**—Herman Kulkman, San Francisco. This device relates to an improvement in mills for grinding bark, drugs and similar material whereby steam is introduced to keep the grinder heated and preventing the bark from sticking and clogging the machine. By the use of this machine the bark may be put into the mill at once without any preliminary drying, thereby saving expense of drying-floors, etc.

**APPARATUS FOR BLUESTONING WHEAT.**—Joseph W. Blevin, Yuba city, Sutter county, Cal. This invention relates to a novel apparatus for bluestoning wheat, whereby the rust, or smut which develops in growing grain, and is produced by foul seed, is prevented. It consists of an inclined trough containing a solution of sulphate of copper, and into which the wheat is conducted, and is carried up through the solution by scoop or buckets to the upper end of the trough, and discharged.

**PLUMB LEVEL.**—Henry Hobson, S. F. The object of this device is simplicity of construction with increased efficiency. It consists of a metal plate set into the side of a common level-block. In this plate are four apertures, having lines drawn through the center of each. A pivoted weight or pendulum is set in the plate. The weight has an arm extending so as to be seen through the apertures.

**WOOL-WASHING MACHINE.**—John T. Davis, San Francisco. This machine consists in a trough provided with a perforated false bottom and a series of revolving beaters which submerge and stir the wool, and at the same time feed it toward one end of the trough, in which there is a series of elevating-rollers which carry the wool to a set of squeezing-rollers, when the water is removed.

**ADJUSTING ATTACHMENT FOR THE POSTS OF POWER-DRILLS.**—C. P. Purinton, Oakland, Cal. This device consists of an attachment for the posts by which such drills are supported, this attachment serving to change the position of the post and the drill, after they have been set and secured in place without the necessity of resetting the post.

**VEHICLE SPRING.**—G. G. Buckland, Tulare, Cal. The object of this invention is to save work and material by simplifying the construction in using no wood for the head-block, nor perches, nor the many iron about the perches and head-blocks in ordinary vehicles, and in providing a better gearing than now in use.

### Chairs and Upholstery.

When we take into consideration the incessant wear and breakage, together with the not unfrequent wholesale destruction of household furniture by widespread conflagration, it often becomes a matter of no little wonder as to whence comes all the chairs and general upholstery that supply our own and our neighbors' houses, to say nothing of the vast quantity used on our river and sea-going craft, and in the public buildings of every town and city in our land. But a stroll through the workshops and ware-rooms of the West Coast Manufacturing Company, would tend not only to satisfactorily settle this question, but it would quite likely lead the observer to wonder, on the other hand, who it is that buys and makes way with all the articles there made. The general reader may be able to glean some idea of the gigantic proportions of this establishment when it is stated that the premises embrace three acres of ground, quite an item of itself to exist in the heart of a city like San Francisco. This factory is located at the corner of Fourth and Bryant streets, the office and sales-room at 432 to 434 Fourth street. The main factory edifice, built of stone, brick and iron, is 635 ft. long by 50 ft. wide and four stories high. The machinery is driven by two steam engines of 150 horse-power each. A saw-mill cuts the lumber from the logs, and a dry-house, having a capacity of 60,000 ft., prepares it for manufacture. An artesian well on the premises furnishes an unlimited supply of pure water. It is estimated this well alone constitutes an economical element to the amount of from \$150 to \$200 per month. There are at present employed in the various departments 107 men and 15 women, the latter being principally engaged in making cane seat work. The goods turned out at this factory comprise everything to be found in a general assortment of upholstery. Chaire, tables, bureaux, children's cribs, and many things accounted sacred to every household, whether of the rich or poor, high or low are made here in such quantities as would seem to imply that forests must be felled to supply a sufficiency of material. All points considered, the proprietors claim the distinction of making the best chairs in the United States. Chamber sets are manufactured by them ranging in price from \$40 to \$500. The woods principally used are walnut, oak, cedar and prima vera; from \$4,000 to \$5,000 worth of lumber being worked up each month. From the condition of uncouth masses in which shape the various woods are imported, they are deftly transformed, almost in a trice, through the agency of adroit manipulation and elaborate mechanism, into the elegant forms which adorn our dwellings, and afford us so much comfort and ease. The excellence of quality, and beauty of design of the work turned out at this establishment cannot be surpassed by anything that is imported from the Eastern States. Not only do the proprietors enjoy a large local trade, but their goods are constantly being shipped to all parts of the Pacific coast, including Mexico and Central America, China and Australia. It is a noteworthy circumstance that orders for this furniture come from so far east as Arizona and Salt Lake City. The West Coast Furniture Manufacturing Company founded this business in 1874, and such has been its progress that it ranks to-day with the foremost industrial enterprises of the world. Altogether, the varied manufactures of San Francisco, like living epistles read of all men, are telling commentaries on our growth and development, and of which our citizens have every reason to feel justly proud.

**WHAT MILL CREEK WANTS.**—An observing gentleman who is tolerably familiar with Mill creek affairs says that "what Mill creek wants is to get up and shake itself, like a mule that has been wallowing in the slough of despond; it wants to stop trying to tear down, and try to build up; it wants to turn out and turn something up, instead of waiting for something to turn up; it wants fewer mining claims to the man, and more men to the mining claim; in fact," concluded the gentleman, "Mill creek wants a good shaking up, for its mines are good and numerous, but its people lack enterprise and dislike to see it displayed by others."—*Bodie Press.*

From a recent issue of the Marysville *Appeal* we clip the following: T. A. McFarland, an old resident of Howland Flat, has returned from San Francisco. He has just sold the Bonanza mining claim and property, located at Howland Flat, to an English company for the sum of \$225,000. Mr. McFarland owned one-third of the mine, and received for his share a check for \$75,000. An undivided one-third interest was owned by Aleck McNey and J. Stone, and the other third by other parties. Mr. McFarland is returning to his home to sell his store and then remove to San Francisco. The purchasing company has an agent in San Francisco, but the home office will be in London.

The *Mountain Messenger*, published by Vaughn & Donner, in Downieville, now in its 28th year, is one of the most prosperous journals in California. It is the third oldest weekly in this State; the *Shasta Courier*, the second, and the *Calaveras Chronicle*, at Mokelumne Hill, the oldest.

### News in Brief.

COLUSA sheep-men are warring on the cayotes.

AMERICAN salmon eggs are being shipped to Europe.

MANY large orchards are being planted at Cordelia.

MARE ISLAND Navy laborers object to the 10-hour rule.

The grain trade of New Orleans is steadily increasing.

The epizootic is in Stockton and several other towns of the interior.

REAL ESTATE is rapidly rising in price at Portland, Or., and vicinity.

THERE are 219 male and 88 female patients in the Oregon Insane Asylum.

ANOTHER rich mining strike is reported to have been made in Cariboo.

THE rent of summer cottages at Newport, R. I., has advanced 10 to 12 per cent.

DEER have become numerous this year in the mountains southwest of Walker lake.

CINCINNATIANS are again having their usual wrestle over the Sunday beer question.

AMASA STONE, of Cleveland, O., has given \$500,000 to the Western Reserve college.

The President of Mexico has signed the railroad grant from the Yaku to the Southern Pacific.

The patents of the Singer sewing machines having expired, anybody can now manufacture them.

At the Mare Island Navy Yard yesterday, the rule for ten hours as a day's work went into effect.

It has been decided at St. Petersburg to erect a religious memento upon the spot where the Czar fell.

THE Southern Pacific of Arizona west-bound train on Sunday had 63 passengers, and the east-bound train 60.

THE British Columbia Parliament appeals to the Queen for justice in regard to railroad matters in that province.

A TUNNEL is being bored through Rincon hill, on the line of Brannan street, for the Brannan street sewer.

THE Senate Committee on Foreign Relations recommend the ratification of the Chinese treaties without amendment.

DURING the past twelve months more hogs have been packed at Chicago than at any city in the world in any one year.

THE story that the Apaches attacked a wagon train in New Mexico and massacred 30 persons is discredited by Gen. Sheridan.

MESSRS. COOMES & PERKINS are building a railroad from the chute at Little river, Mendocino county, to the Buckhorn mill.

MANY Chinese laborers on the railroad in British Columbia have contracted the land scurvy, making workmen very scarce.

AN imperial ukase has been issued at St. Petersburg, which confirms and maintains the religion, laws and privileges of Finland.

DISPATCHES from the City of Mexico say the President has signed the railroad grant for a road to connect with the Southern Pacific.

THE sash and door-makers of New York demand an increase of wages, or they will strike. Other trades are moving for an advance in wages.

SEVERAL petards were exploded on Saturday night in the streets of Madrid. It is supposed they were directed against the prefect of police.

HARRY GENER, (known as "Prince Hal"), one of the Tweed ring of official plunderers in New York city, was on the 12th instant sentenced to the penitentiary and fined \$6,604.

SEVERAL nuggets of gold have been picked up in different parts of Butte county during the past few weeks. Most of them have been found above ground and uncovered by the recent high water.

It is said at Washington by those who know them, that Hayee could dismiss the cares of office and go to sleep, but that Garfield takes the anxieties of the day to bed, hence loses much needed sleep.

PAYMENTS due from Russian peasants for lands allotted to them on the abolition of serfdom are about to be reduced in 25 governments by 40 to 70%, the total reduction aggregating 9,000,000 roubles yearly.

THE New York Co-operative society opened its first store on Thursday, at No. 7 Clinton place. The stock taken so far amounts to \$5,425, and this is distributed among 217 persons. It is stated that the store will start with a patronage of about 150 families.

GLADSTONE'S strength is giving way. He looks like a wreck of his former self. While speaking in the House he constantly rubs his hands slowly across his forehead, as if suffering from pain or trying to collect his thoughts. The troubles which face him in India, Ireland and the Transvaal weigh heavily.

A GENTLEMAN having an eye to business on a large scale is thinking of utilizing Russian river by tapping it about five miles south of Cloverdale for a water power. He says that a fall of about 175 ft. can be obtained at Healdsburg—sufficient to drive the machinery of a large per cent. of all the present manufacturing interests in the State.

It is claimed that at Iowa City, Miss Hattie Deul, a sister-in-law of Dr. Aylworth, has not eaten a morsel of food for 25 days, nor has she spoken a word for three years. She abstained from food on the ground that it was her religious duty to do so, and from talking for the same reason. The persuasion of her friends is needless, and she is slowly wasting away.

### Claims Against the French Government.

We call the attention of all persons having claims against the Government of France, that we have perfected arrangements for their prompt presentation to the French and American Claims Commissioners now in session in Washington City, under a treaty lately ratified by the two Governments. The treaty provides as follows:

"All claims on the part of corporations, companies, or private individuals, citizens of the United States, upon the Government of France, arising out of acts committed against the persons or property of citizens of the United States not in the service of the enemies of France, or voluntarily giving aid and comfort to the same, by the French civil or military authorities, upon the high seas, or within the Territory of France, its Colonies and Dependencies during the late war between France and Mexico, or during the war of 1870-71, between France and Germany, and the subsequent civil disturbances known as the 'Insurrection of the Commune'; and on the other hand, all claims on the part of corporations, companies or private individuals, citizens of France upon the Government of the United States, arising out of the acts committed against the persons or property of citizens of France, not in the service of the enemies of the United States, or voluntarily giving aid or comfort to the same, by the civil or military authorities of the Government of the United States, upon the high seas, or within the territorial jurisdiction of the United States, during the period comprised between the thirtieth day of April, eighteen hundred and sixty-one, and the twentieth day of August, eighteen hundred and sixty-six, shall be referred to three Commissioners, one of whom shall be named by the President of the United States, and one by the French Government, and the third by His Majesty, the Emperor of Brazil."

The Commission has adopted the following rule to regulate the presentation of claims:

"In addition to the representation of his claim, and the proofs in support thereof which shall have been presented to his Government, the claimant shall file in the office of the Commission a statement of his claim, in the form of a memorial addressed to the Commission."

"No allowance will be made to any person for any share of, or interest in a claim unless he appear as claimant and set forth his interest."

"If a claimant be dead, his executor or administrator, or the legal representatives of the estate, must appear, unless it be shown that there are no creditors, and that the estate is settled."

"If there be a widow of the deceased claimant, she must appear as claimant, or her share will not be allowed."

"If there be heirs, they must appear, unless they are minors under 21 years of age. Minors must appear by guardian or tutrix."

"All persons may be joined as claimants in whom the right to any legal or beneficial relief is alleged to exist, whether jointly, severally, or in the alternative. Any award may be given to such one or more of the claimants as he or they may be entitled to."

"Every memorial shall state the name, residence, and postoffice address of the claimant, and the place and time of his birth, and, if a French citizen, the place or places of his residence between the 13th of April, 1801, and the 20th of August, 1860, and if an American citizen, the place or places of his residence during the war between France and Mexico, the late war between France and Germany, and the 'Insurrection of the Commune.'"

"Parties having claims against either Government, of the character provided for by the treaty would do well to communicate with us at once, as only about four months remain in which such claims can be presented to the Joint Commission for payment."

DEWEY & CO.

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### In the Whole History of Medicine

No preparation has ever performed such marvelous cures or maintained so wide a reputation, as *AYER'S CHERRY PECTORAL*, which is recognized as the world's remedy for all diseases of the throat and lungs. Its long continued series of wonderful cures in all climates has made it universally known as a safe and reliable agent to employ. Against ordinary colds, which are the forerunners of more serious disorders, it acts speedily and surely, always relieving suffering, and often saving life. The protection it affords, by its timely use in the throat and chest disorders of children, makes it an invaluable remedy to be kept always on hand in every house. No person can afford to be without it, and those who have once used it never will. From their knowledge of its composition and effects physicians use the *CHERRY PECTORAL* extensively in their practice, and Clergymen recommend it. It is absolutely certain in its remedial effects, and will always cure where cures are possible.

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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

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INVENTORS, and others interested, will receive DEWEY & CO.'s MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.



## Pocket Mining Atlas,

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The State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hauks, State Mineralogist.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce, and valuable for future reference and library use.

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### DIVIDEND NOTICE.

OFFICE OF THE

#### Eureka Consolidated Mining Company.

Nevada Block, Room No. 37, San Francisco, March Fifteenth (15), 1881.—At a meeting of the Board of the Directors of the above named Company, held this day, a Dividend, No. Sixty-five (65), of Fifty (50) Cents per share was declared, payable on Monday, March Twenty-first (21), 1881. Transfer books closed until the Twenty-second (22) instant.

P. JACOBUS, Sec'y pro tem.

#### Booth Gold Mining Company.—Location

of principal place of business, San Francisco, California. Location of works, Auburn, Placer county, California. Notice.—There are delinquent, upon the following described stock, on account of assessment No. 3, levied on the second day of February, 1881, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
L A Booth, trustee.....	34	1,000	\$30 00
L A Booth, trustee.....	35	295	8 85
L A Booth, trustee.....	87	1,000	30 00
L A Booth, trustee.....	119	250	7 50
L A Booth, trustee.....	26	5	15
Hugh Burns.....	120	50	1 50
R Chonery, trustee.....	160	6,275	188 25
R Chonery, trustee.....	17	5	15
Thomas Day.....	148	500	15 00
T H Gordon, trustee.....	68	1,000	30 00
T H Gordon, trustee.....	112	100	3 00
T H Gordon, trustee.....	114	100	3 00
T H Gordon, trustee.....	116	100	3 00
T H Gordon, trustee.....	117	100	3 00
T H Gordon, trustee.....	118	100	3 00
Henry Ollmore.....	33	300	9 00
R Hunter.....	121	25	75
G A Miller, trustee.....	40	100	3 00
G A Miller, trustee.....	41	100	3 00
G A Miller, trustee.....	42	100	3 00
G A Miller, trustee.....	44	50	1 50
G A Miller, trustee.....	45	50	1 50
G A Miller, trustee.....	46	45	1 35
G A Miller, trustee.....	74	325	9 75
G A Miller, trustee.....	75	300	9 00
G A Miller, trustee.....	10	5	15
Geo R Spinney, trustee.....	95	1,000	30 00
Geo R Spinney, trustee.....	140	500	15 00

And in accordance with law, and an order of the Board of Directors, made on the second day of February, 1881, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the Auction Rooms of John Middleton & Son, No. 116 Montgomery St., San Francisco, Cal., Monday, the 25th day of March, 1881, at the hour of 2 o'clock, P. M., of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.

GEO. R. SPINNEY, Sec'y.

Office.—Room No. 44, No. 314 Pine St., San Francisco, California.

#### Lewis Consolidated Silver Mining Company.

—Location of principal place of business, San Francisco, California. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Twenty-third (23) day of March, 1881, an assessment, No. Four (4) of Six (6) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. Gold Coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Second (2) day of May, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Twenty-third day of May, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. PEW, Sec'y.

Office, No. 310 Pine Street, Room 15, San Francisco, Cal.

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CHAR. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer

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AMORY SULLIVAN.....Manager.

### UNKNOWN.

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KRELLING BROS.....Manager

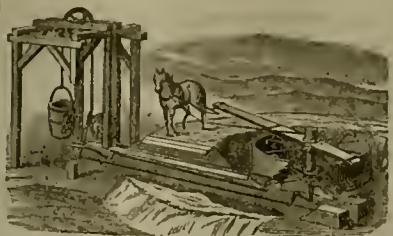
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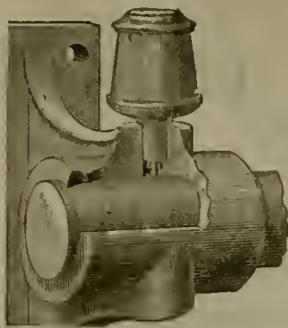
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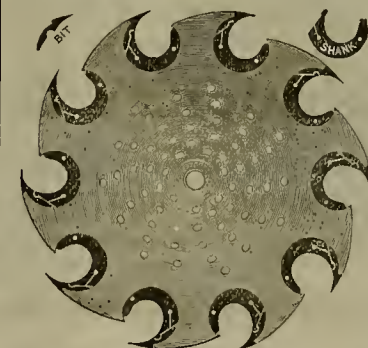
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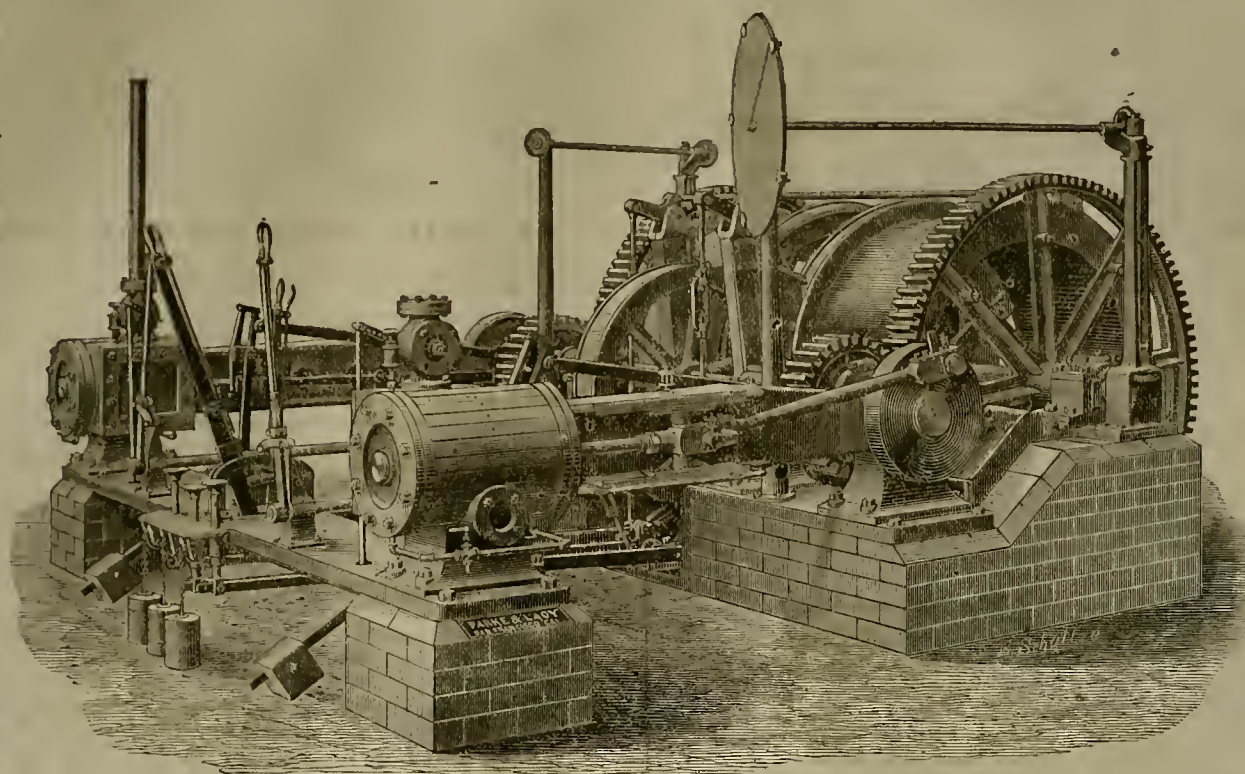
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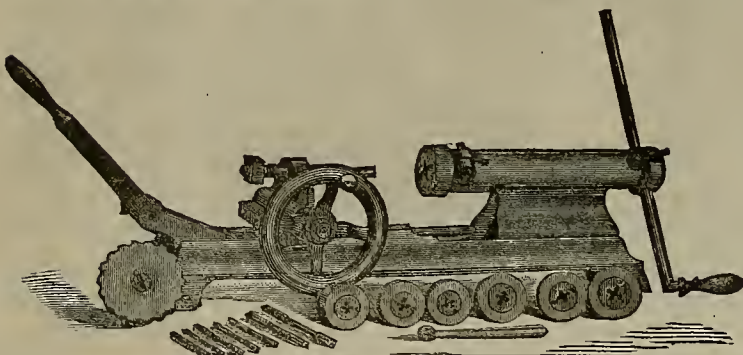
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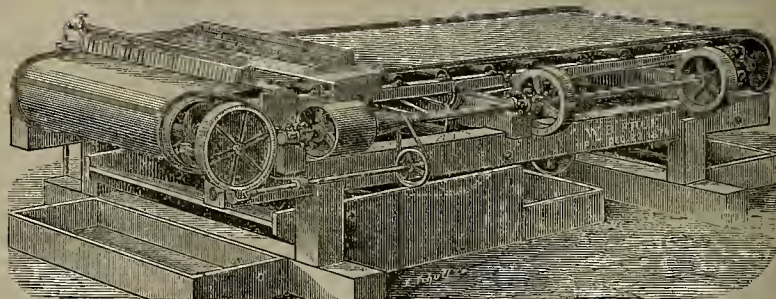
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SAN FRANCISCO, SATURDAY, APRIL 2, 1881.

VOLUME XLII  
Number 14.

## Mining in Sierra County.

We had an opportunity this week of conversing with Mr. E. K. Downer, of the *Mountain Messenger*, Downieville, Sierra county, Cal., who tells us that the present year promises to be one of the most prosperous ever known in the eventful history of Sierra county. Many new mines are being opened and sold, and a number of partially developed ones have been taken hold of by capitalists who will put them in shape to be sources of profit.

The most noticeable thing which has occurred in this county of late has been the sale of the Bonanza gravel claim at Howland Flat for \$225,000 cash, the money having been paid. This big sale was very quietly consummated. The purchasers are reported to be Scottish capitalists, the agency of the company being here; the principal office, London, England. Three promising adjacent gravel claims were also sold for the sum of \$125,000.

Articles of incorporation of the Forest Queen quartz mining company have been prepared, and will be filed in a few days. Some 20,000 shares have been sold for a working capital, and 10,000 more will be similarly disposed of, the total number being 100,000. Dr. F. M. Biber will leave shortly for Sierra, and as soon as roads will permit the transportation of machinery, a 10-stamp mill will be put up, on the north end of Durgan Flat, at Downieville. A Richman drill is to be used at the mine. Dr. Biber is rapidly perfecting arrangements by which Ohio capitalists will develop some other mines in Sierra.

The Jupiter Consolidated quartz mine, at Goodyear Bar, has been bonded to an English company.

Mr. Downer is interested in the Bald Mountain Extension gravel mine at Forest City, and informs us that the tunnel is in 3,400 ft., 400 ft. of which is fine-looking blue quartz gravel, the top of which prospects in heavy lead gold. It is uncertain yet how far the main tunnel is above bedrock. The future prospects of the mine are encouraging, as it is being demonstrated that the extension of the main lead of the noted Bald Mountain claim comes through the extension ground for three miles, and beyond to Gold Lake. The gross yield of the Bald Mountain for the past eight years has been very close to \$3,000,000, half of which was dividends, on the trifling investment of \$20,000 for opening the mine. The assessments on the claim for the last seven months have been \$1,800 a month. They began to run the long tunnel two years ago last December. It costs about \$5.50 per ft., and up to present time the total cost of locating, patenting, running tunnel, etc., has been over \$30,000. They ran for 1,400 ft. through soft bedrock, only 50 ft. of that distance being in hard rock. Then for a few hundred ft. they met lava, and there they made 100 ft. per month. After that came soft bedrock, succeeded by gravel. They are now running for rimrock, and then intend to come back and sink for bedrock in a good many places, until they are satisfied they have found the center of the channel, and will then start the main tunnel up the ridge, and breast out for pay. The company owns 1,300 acres of ground, and is composed entirely of Downieville men, one of these being Hon. John Weil, State Treasurer. The company is a private one, no stock being for sale. The theory maintained by old miners up there is, that this channel is the extension of the famous Live Yankee channel, which yielded its hundreds of thousands in the palmy days of Sierra.

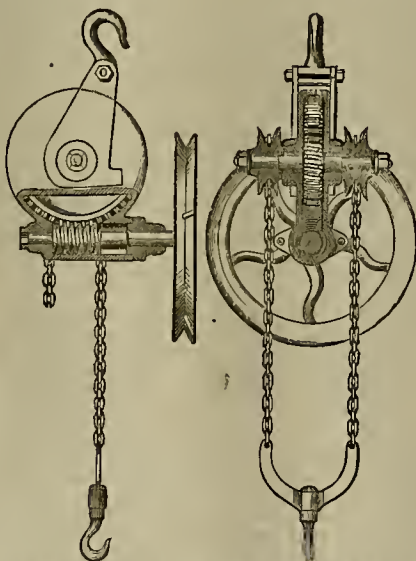
The Four Hills quartz mine has just been sold to San Francisco capitalists for \$40,000, and it is hoped the mine will prove, when opened, a second Sierra Buttes. A road will be built from Downieville to this mine. Then 17 miles more will connect that town with the Plumas-Eureka mine near Jamison, Plumas county.

They have been running a new tunnel called "No. 8" into the lower part of the Sierra Buttes mine, three miles from Sierra City, in which very rich quartz has been found. This settles the question of its paying well for an indefinite period. At one time it was thought that the mine showed signs of "petering."

## Screw-Hoisting Machine.

We illustrate here with a patent portable double chain screw hoisting works, now being introduced for the first time on this coast by Parks & Lacy. The larger cut is a perspective view, and the smaller ones show sections from which the working parts will be understood. With this machine one man can lift from 250 to 15,000 lbs., according to size of machine. The peculiarity of the appliance is that the chains work at any angle with less friction and more speed, and with very much less power than is usually required. With the medium sizes, 35 lbs. will raise 1,000; and 15 lbs. will lower 1,000.

This load being received on two chains instead of one, it is doubly secure, and the possi-



HARRINGTON'S PORTABLE DOUBLE CHAIN SCREW-HOISTING MACHINES.

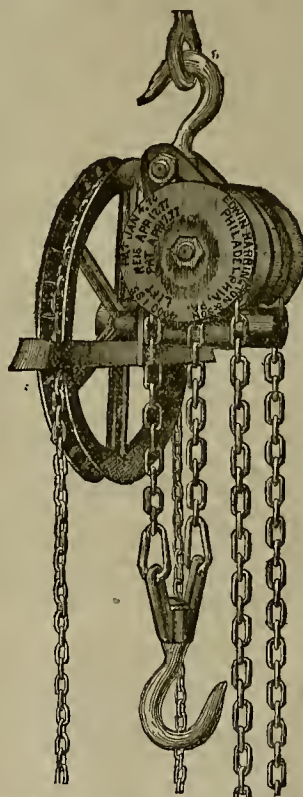
bility of slipping is prevented. All the pulleys being at the top of the machine, there is no danger of accident to the workmen, and the load can be raised high. The chains are never under the feet, and as the hoisting chain can be readily removed from the pulleys, the machine is more easily put in place. It works with perfect smoothness under all circumstances. The load cannot rise or fall a hair-breadth, except at the will of the workman; and an exact adjustment of the load is secured.

The working chain is independent of the hoisting chain, and the stretching of the chain does not prevent the proper working of the machine. These hoists are so arranged that they can be run at a rapid rate, either in hoisting or lowering any distance required. They are supplied with an efficient brake, for ease and safety in lowering the load. While the load is being raised with one end of the chain, the other end is descending for a fresh load. With the 1,500 hoist, one man can lift 600 lbs. 10 ft. a minute; with the 1,000 lbs. hoist, 300 lbs. 20 ft. in a minute.

D. A. HILLER has commenced suit in the Superior Court against C. J. Collins, J. C. Bolles et al. and the Equitable Tunnel mining company to restrain them from transferring 16,017 shares of capital stock to defendant C. J. Collins, and to enjoin them from selling 10,250 shares held by plaintiff, on which an assessment is due, and also to compel Collins to pay over \$2,831.26 to the corporation.

## Fraudulent Assessments.

James R. Rogers has commenced suit against Robert Sherwood et al., to recover \$103,800. Plaintiff charges that defendant Sherwood, with the assistance and connivance of Wm. H. Martin, the secretary, levied an assessment as officers of the Scorpion Silver Co., on November 6, 1872, with an intent to defraud M. Eldred, Jr., C. D. Waters and E. A. Waters out of their stock. That there was no need for any assessment, this being the 27th levied. That the defendants knew the company required no funds and levied the one in question when there was no quorum of the directors present, simply to defraud stockholders out of their stock. That on the



31st December, 1872, they sold the stock of the above named parties, amounting to 161 shares in the aggregate. The complaint further charges the levying of assessment 28, of 50 cents per share, in February, 1873, for the purpose of freezing out one Frank Henderson, who held 228 shares of the Scorpion Silver mining company, and one A. Genssy, who held 132 shares of the same, both assessments being unnecessary and fraudulent, the previous assessments not having been paid up by other delinquent stockholders, nor their stock sold. Further, that, to perfect the scheme, on the 31st of December, 1873, said defendants passed an order to sell 10,000 shares of the capital stock, including the stock heretofore described, which defendants bought in through their agents, William Deans & Co. That the stockholders above named only discovered the fraud practiced on them on the 6th September, 1880, since which time they have assigned their rights to plaintiff, James R. Rogers. That the stock, having been divided up from 4,000 to 40,000 shares, could have been sold since for \$20 per share, making plaintiff's interests, of which he claims to have been defrauded, worth \$103,800, for which he asks judgment.

THE New York Central Tunnel railroad company has filed articles of incorporation at Albany, New York. Its object is to run a tunnel from the City Hall at New York to the Grand Central railroad depot.

## Mines of Sonora, Mexico.

The mines of Sonora have been worked from time immemorial. The immense number of old mines that have a history clouded with early traditions prove the ancient character of the mines of Sonora. Some have been known to reach back 100 years, and others have no data to determine the first period in their history. The number of abandoned mines is considerable, some of which were unquestionably exhausted, while others were abandoned on account of the ignorance of the miners on reaching ores that were refractory or hard to work. Right here it might be well to caution American capitalists against buying holes in the ground, solely because, at one period in their history, they had yielded millions.

Most of the abandoned mines, or quite a large number of them, and of the richest, have been ruined by the class of miners of Mexico called "gambucinos," a poor class who had no capital, and were in search of "bonanzas," or rich spots, working these solely, and filling the drifts and shafts behind them with rejected ores and rubbish, so that when they finished a mine it was almost entirely ruined. In some instances, they have extracted the pillars of old mines of great value, and the walls have fallen in, thus doing an incalculable injury to the mines of the State. There is an old Spanish proverb that tersely states: "It takes another mine to work a mine."

This is undoubtedly true of every mine abandoned by these miners. We use strong language on account of the destruction following in the wake of the "gambucinos." The warning of Mr. Mowry to capitalists in his valuable work on Arizona and Sonora, we herewith quote: "As it is desirable that, in the investment of foreign capital there should be no error committed at the outset, than which nothing would retard the progress of this new mining field more; all persons new to the country had better leave abandoned mines alone, unless directed to them by persons long resident in the country, whose character and veracity are undoubted, and who, after the investigation of all the facts, current accounts, and traditions, have full confidence in some abandoned mine or other. There are, undoubtedly, many abandoned mines that are well worthy of attention and outlay of capital, but strangers are not likely to know at once which of the many deserted mines it will be prudent to meddle with. Under the present state of things, the safest investment for new comers will be those mines that have bona fide owners, for, as long as a mine can be worked according to the custom of the country, it is hardly ever abandoned altogether. The owners are fully alive to the value of their possessions, and as they are already in a more or less independent position, and always in expectation of a sudden fortune, they are not anxious to sell unless induced by a fair offer. It is not advisable to enter into any arrangement with Mexican miners to furnish capital to open up a mine, but it is better to buy the whole at once."

CRYSTALLIZED GOLD.—We were shown this week by H. B. Maize, a very curious little gold nugget which he found in a placer claim in Hungry gulch, near Pine Grove, Amador county. The specimen would weigh less than a dollar, and is a perfect pyramid, the base being, however, somewhat irregular. It is apparently a piece of crystallized gold. The faces are perfectly smooth and regular. Such a specimen is exceedingly rare. Close by the spot where this was found Mr. Maize dug up a specimen of gold-studded quartz, showing there is a very rich quartz ledge near by. There are plenty of quartz ledges in the vicinity, but none which show anything like these specimens. They get gold in the dirt of these ledges, but little gold in the rock.

GERMAN TEXT INJURIOUS TO THE EYES.—In view of the opinions lately expressed by eminent oculists, that the reading of German text is injurious to the eyes, the Bernese government have resolved, as much as possible, to discourage its use, and all their official announcements and reports will henceforth be printed exclusively in Roman characters.



## An Improved Steam Pinnace.

A boat of a very novel origin has been successfully tried in the Solent, and submitted to the dockyard officers at Portsmouth for their approval. It was built by Mr. S. White, of East Cowes, and in size, shape, and general construction is almost an exact copy of the 48-ft. steam furnace which has been supplied to the navy for guard and other purposes. The distinguishing feature of the new boat is the manner in which the deadwood and keel have been cut away to the extent of about one-half of its length, by which a free flow of water to the screw is secured. The advantage, however, does not consist in any accession of speed while going ahead, which remains the same, but in a considerable gain to speed in going astern, which it can do as rapidly as ahead, and in the remarkable handiness which the new principle confers in going round.

A very small acquaintance with vessels is sufficient to show that when the helm is put hard over, the stem of a boat makes but little forward progress, but is made the pivot upon which the stern revolves. As the stern is invariably more deeply immersed, the result is that, in turning, the craft is compelled to force back a wall of water, which retards the boat in going round, throws great strain upon the rudder and the gear, and increases the work of the engines. In cutting away the deadwood, the resistance of the water is reduced to a minimum, as it escapes under the quarter, and the pinnace was found on trial to turn a complete circle under full power in one and a half of its whole length.

The new design also enables the craft to stop almost dead, its way being arrested by a supplementary rudder, which is placed abaft the screw, and is worked simultaneously with the ordinary rudder outside. By placing this rudder at right angles with the keel, it acts as an effectual brake, and arrests the way of the craft. It was feared that the reduction of the depth aft would have the effect of diminishing the stiffness of the pinnace in turning, but practical tests have proved that the difference is scarcely appreciable. The great drawback which has hitherto attached to torpedo craft is the size of the circle which they require in turning, a defect which has been partially remedied by fitting a drop rudder forward.

Should Mr. White's plan be found applicable to them, their activity in the water will be greatly increased by its adoption. The little craft was put through a severe trial last Saturday. The behavior of the pinnace has answered every expectation, while its remarkable handiness surprised the officers in charge. At a previous trial the boiler pressure, with closed stokehole, was 120 lbs. (the same as in the torpedo craft), while the air pressure from the fans equalled 4 inches of water; the revolutions per minute were 435, and the horse power indicated 90. Six runs were made, the mean speed ahead being 12.356 knots per hour. Two runs were afterwards made with the screw going astern, the result giving an average speed of 10.14 knots, the revolution being the same.

The steering qualities of the boat were next tested, when the absence of the after deadwood gave some remarkable results, the boat circling to starboard and to port in 30 seconds, or one-third the usual time, in a space having a diameter of 72 ft. With the engines going astern the pinnace turned in 1½ minute. As the propeller shaft revolves in solid water, and is only connected with quarters by means of a bracket, there was a remarkable absence of vibration. The two rudders are simultaneously actuated by means of gearing and a double worm, which effectually locks the rudder, and thus enables the wheel to be left to itself. —*London Times*.

SIR H. BESSEMER ON HIS IMPROVEMENTS.—Sir Henry Bessemer was presented with the freedom of the Cutlers' Company on Wednesday, Mar. 16th, and was subsequently entertained at a banquet, in recognition of his services to the cause of technical education, which the company is endeavoring to promote. The Master, in proposing "the health of Sir Henry Bessemer," said that gentleman had done that for the prosperity of his country which would continue to be fruitful of good in future generations. In proof of the manner in which the influence of his work in this country spread beyond our shores he mentioned that he had recently received an application from Ohio for copies of the lecture which had been delivered in that hall. Sir Henry Bessemer, in acknowledging the toast, said with regard to the educational movements which had been so long commenced by the Cutlers' Co., if he could further their efforts in that direction he would be pleased to do so. That the Master should have received a note from across the Atlantic in reference to his lecture he was not surprised, because no country was more ready than America to take advantage of the improvements of the age. His invention had been most cordially taken up in that country, for which he had received a token of American regard. There had, however, been a specialty in the mode of recognizing his services there which was well worthy of the people. They had no crosses, orders, honors, or titles to bestow, but they had done him the great honor of naming a rising city in Illinois after his name.

RAIN AND CULTIVATION.—Prof. Aughey claims that more rain falls now in Nebraska than formerly, and that this rainfall is increasing with the march of settlement and consequent cultivation.

## Only a Trespass.

Through a misunderstanding of the facts of the case and the points involved, some of our people were a little down in the mouth when they heard of a decision having been given for the defendant in the United States District Court, San Francisco, in the late suit of the Jupiter mining company against the Bodie Con. mining company. They were under the impression that through the decision the Jupiter folks lost their mine. This is not at all the case. It appears in drifting the Bodie Con. folks ran across the line and into the Jupiter ground. While drifting in the Jupiter ground, they cut a vein of quartz (probably a feeder of the Jupiter vein), about 18 inches in width.

The Jupiter company then sued the Bodie Con. company for trespass. The latter company admitted that they were over on the Jupiter ground, but claimed that the seam of quartz into which they cut dipped in such a way that if followed up, the top of it would be found to be on their own ground, and held that they therefore had a right to follow it wherever it went. It would seem that this view of the matter was very strongly pressed and impressed upon the minds of the jury, therefore they brought in a verdict that no trespass had been committed.

Competent miners are quite confident that if the quartz stringer were to be followed upward, it would never be traced out of the Jupiter ground, let alone to or near to the surface. Some think it would be found to wholly run out before being followed upward 30 ft.; thus it would never get anywhere near the Bodie Con. ground, as where cut the feeder is 70 ft. from the line of that company.

The case is the same as if some company here on the Comstock had drifted west into the California and Con. Virginia ground until they had reached the feeders of ore on the 1,550 level which those companies are now working out to the eastward of their old stopes. Then when the companies named brought suit for trespass the interlopers would claim that the dip of the feeder would carry it to the surface in their own ground to the eastward—provided it should live to go so far.

Though a jury might be so far impressed with this view of the case as to give a verdict in favor of the interlopers, yet their decision would by no means give the raiders any claim to the main vein as worked in the California and Con. Virginia.

The Jupiter has one of the oldest and most perfect titles in all Bodie district, and no one should be so foolish as to sacrifice his stock just because that company failed to make its trespass suit stick. The worst thing about the whole business is that the verdict throws the cost upon the Jupiter folks, and that will amount to a mere trifle distributed among the many stockholders.

Mining men get a new wrinkle from this decision. Here is found a stringer of quartz before unknown to every one; it is found in the ground of another company, yet the finders take the angle of it and assert that it is their property because the dip shows that it crops out in their ground. In the Bodie-Jupiter case unprejudiced persons, who took the dip of the feeder, asserted that, even allowing the Bodie folks to follow it, it would go to the surface within the Jupiter lines. Even though the Bodie folks shall be allowed to keep the feeder they are on, and follow it upward, it will in no way interfere with the main lode of the Jupiter. —*Virginia Enterprise*.

THE WALKER RIVER MINES.—Persons interested in the copper and other mines of the Walker River country, are much encouraged in view of the good results obtained at the Ludwig furnace. It is turning out about three and a half tons per day of copper ingots. The ingots assay 96% pure copper, the remainder being iron, while assays of the slag show but one-eighth of 1% of copper. This is remarkably clean work. The supply of copper ore is almost inexhaustible, and is very easily mined. No doubt other furnaces will soon be erected in that region and several flourishing mining camps built up. There are in that region not only many veins of copper ore, but also those containing gold and argentiferous galena. This smelting region will no doubt make a large amount of business for the Carson and Colorado, and should be fostered by putting down the freights on the coke taken in and the copper brought out to the lowest possible notch. Beyond this to the eastward there are doubtless other places where furnaces may be profitably run on ores of various kinds. —*Virginia Enterprise*.

A VALUABLE DISCOVERY.—A ledge of gold-bearing quartz of great size has been found in the San Francisco canyon, near the old stage road between here and Los Angeles. It is easy of access, plenty of wood and water convenient, and is said to be one of the most promising discoveries of the kind ever made in the State. Placer mining, on a limited scale, has been carried on in this canyon from time immemorial. Prospectors have always believed that rich and extensive leads of gold-bearing quartz would be found there, but this is the first great find ever discovered to warrant their faith. It is a matter of history that the first gold ever discovered in California was found in this canyon in 1841. If surface indications are worth anything, the debris that covers the bedrock there—the wash and accumulation of ages—covers the best gold lead on this coast. —*Kern Co. Californian*.

## Industrial Partnership.

In the hall of the Society of Arts, on Wednesday the 16th inst., a paper was read by Mr. Sedley Taylor, M. A., late Fellow of Trinity College, Cambridge, "On the Participation of Labor in the Profits of Enterprise." Mr. W. H. Hall was in the chair. Mr. Taylor remarked that his justification in bringing the subject forward was to be found in the consideration that the relations between employers and employed under the system of payment by paid wages only were admitted on all hands to be unsatisfactory. This involved a chronic antagonism, breaking out periodically into internecine conflicts, which caused mutual exasperation. The bulk of these experiments had been made on the continent, and though not without examples of failure, they presented on the whole a very decided and encouraging success.

He then described, in a manner necessarily fragmentary, the main features of participation as practiced on the Continent. As to the system itself and its applicability to English circumstances, the theory on which it was based was that by directly interesting workmen in the fruits of enterprise better and more economical labor would be obtained, and thus a source of additional profits opened. These surplus profits, without injustice, might be allotted wholly to the workmen whose stimulated efforts produced them. In practice, however, a share went to the employer, who, if he pleased, might invest it in a reserve fund and protect himself against losses in bad years. Thus participating workmen did, in an indirect, but perfectly real way, share losses as well as profits with their employers. Participation successfully practiced, under whatever form, conferred signal benefits on the parties directly concerned in it. To the employer it gave industrial peace and increased security; for the thrifty workmen it accumulated as the result of his own efforts an economical capital which he might employ in making his old days easy and independent, or enable him to transmit a provision to his children. It brought to the workman likewise an enhanced feeling of respect for himself and his fellows.

Participation encouraged excellence of workmanship, and combated every form of trade dishonesty with singularly efficacious vigor. Considerations could be adduced to show that there was no lack of scope for participators' successes in many branches of English industry. He was inclined to think that participation in profits, if once clearly set before the working classes of this country, would soon be thoroughly understood and appreciated by them. His own conviction was that participation had a great future before it in this country. The work might well be undertaken by a special society, which should endeavor to facilitate in England the practical study of participation, whose objects should be identical with those of the French society, and which might spread sound knowledge on the subject; and he would be very pleased to receive at Trinity College, Cambridge, the names and addresses of any persons who would be disposed to join such a society, should it be called into existence. A discussion followed in which Mr. Lloyd Jones and other gentlemen took part, and which was adjourned to a day to be hereafter announced. —*Engineering and Building Times*.

## Does Mining Pay.

The question of the hour, does mining pay? can be answered very readily—quite as readily as if the interrogatory was made applicable to any other industry. The manufacturer, the merchant, or the farmer, in engaging in either pursuit, has at first in hand a problem to solve. He enters into the undertaking with hopes of success, and sets about the business with such experience as he may be possessed of; and as a rule, which all have experience must know, with capital necessary to prosecute the particular line of business selected. Prospecting for mineral is not mining, as many suppose, any more than farming is an industry without suitable soil for tilling. Many labor under the impression that a mining claim valued by the prospector at \$10,000 to \$100,000 is a mine; and here is a point, reached early in the history of the ambitious, where the mistake is made. There are many well-informed people who have but a faint conception of what constitutes a mine. To look at a prospect hole, or a mineralized vein, an incline or a drift, or even a deep shaft, does not at all times prove the existence of a mine.

Mining has advantages over many other industries, when all the preliminary work is perfected; and it is with this work that the industry becomes a success or a failure. To find a paying mine, we must unlock the hidden treasures of the earth's inner surface, and overcome the jealousies of locality. Mother earth in reality is a mine, and in her hidden treasures the paying mine is found to be a storehouse of ponderous rock. Paying mines exist in every well-known mining district; and when opened, and the business conducted upon conservative principles, the profits will compare favorably with any industry known. To secure the desired mine, the mere prospect may be passed; we must enter where the natural forces have gathered and blended in successive ages that chemical combination of primitive rock; and with capital, industry and the various scientific experiments given us, test the value of nature's generous deposits. These exist in fabulous quantities from Mexico to Montana, and as settlement is made in those regions, mining becomes more general and profitable. —*Boston Economist*.

## A Ruined City.

Four miles northeast of town, near Ross' Mills, there are several large and regularly shaped mounds. The largest of these mounds is within 20 ft. of the well-traveled road to Tempe. It is about 40 ft. high, and, when once the curiosity hunter has clambered through the debris of fragments of adobe and earthen pottery which covers the sides to the summit, he is rewarded by discovering the well-defined divisions of what was once a large house. Although large trees of the slow-growing mesquite have sprung up, the adobe walls which divided the interior of the building into rooms still remain whole and intact a foot beneath the surface. In some of these walls there still remain the ends of the rafters used to support the floors. All these pieces of rafters are charred, and appear as though they had been at one time subject to intense heat.

Looking to the northwest from the top of this ruin the eye sweeps a small plain, thickly dotted with mounds which differ from the large one only in size, and the whole is enclosed with the remains of what was once a thick adobe wall, the southeast corner of which was formed by the large house. An examination of the ruins discloses a regular system of streets running north and south, intersecting one another, and forming regular and equal-sized squares. Immense quantities of broken pottery strewn the ground, and from these fragments, a relic hunter can select, with a little patience, a score of pieces, with each piece bearing a different design; but this variety in design applies only to size and shape, as no colors save black, dark blue and dark red appear to have been used by these ancient decorators.

Here and there can be found fragments of shell ornaments, bracelets, ear-rings, etc., manufactured from a shell somewhat similar to abalone. Everything connected with this desert of ruins tends to give rise to the opinion that the destruction of the city was sudden, speedy and complete; but when and in what manner, it, in common with other cities, was blotted from the land we now occupy, must forever remain a matter of conjecture. —*Phoenix Gazette*.

## French Merchant Shipping.

The new law under which French shipbuilders and ship owners are to receive substantial bounties from the State, has already had quite a contrary effect to what was expected. The jealousy of manufacturers has been aroused, and a reaction has set in which must be regarded as a signal for more clamorous demands in the same direction. A writer in the *France* ridicules the statement in the preamble to the new act that the bounties are accorded "in compensation for the charges which the Customs tariff imposes on shipbuilders," and "for the charges imposed on the merchant navy for furnishing recruits and the service of the military marine." "If," says the writer, "the Customs tariff is defective, it should be amended. Otherwise, now that bounties have been granted to shipbuilders, the same favor must be accorded to cotton spinners, forgemasters, and everybody else." Moreover, it is pointed out by the writer that, if, after all the efforts made to improve the position of the French commercial marine, they should result in failure, ship owners might console themselves by the thought that the evil, Great Britain alone excepted, is universal, and that bounties will nowhere bring about the slightest remedy. The article concludes:

"Italy, which formerly built ships representing an annual tonnage of 100,000, did not perhaps, add 20,000 tons to her home-built shipping a year ago. The United States, which at one time carried by sea 90 per cent. of their own merchandise, were only represented last year by 15 per cent. A fatal revolution has occurred. Steam has swept away sails, and iron and steel have taken the place of wood. And with what result? That vessels are now mostly built where iron, steel, machinery and coal are obtainable at the lowest rates, or, in other words, at Glasgow on the Clyde, Newcastle on the Tyne, and Sunderland on the Wear. The shipbuilding yards of London and Liverpool have themselves had to give way." The French will sooner or later regret that common-sense views such as these should have had no effect in altering the mischievous decision arrived at by the French Legislature, which, however, fortunately, is not irrevocable. —*Iron*.

A BLIND MAN INSPECTING A MINE.—A short time since two men, one of whom was totally blind, requested of Edward Coleman, Supt. of the Idaho, the privilege of going down into the mine to take a look at the underground workings. Mr. Coleman who is always accommodating to visitors in this respect courteously assented, much to the astonishment of Uncle Billy Thomas, who acts as chaperon to visitors on such occasions, who remarked, "Well, by golly, I have taken all kinds of people down into the mine,—ladies and gentlemen, the lame and the halt—but this is the first time I ever heard of a blind man wanting to go down." He said afterwards, with a grim smile, that he gave the blind man a lighted candle, as it was the regular and proper thing to do. The visitor was highly pleased with his trip on the cage, and his underground trip 1000 ft. below the surface, but Uncle Billy has not yet recovered from his surprise that a man who could not see should desire to go down into the Idaho to see how things looked in its cavernous depths. —*Graess Valley Union*.



## MECHANICAL PROGRESS.

## Metals and Paints.

The subject of painting metallic bodies is not generally understood by many painters or architects, and as in this country there is a great necessity for the proper covering of all metallic surfaces to shield them from the elements, the subject will bear investigation with profit. Metallic paints and other compound chemical mixtures, are heralded as the paint for all work, whether wood or metal. It is true of these, and many other kinds, that they are good for painting, but not for preserving metals from oxidizing.

All fine preparations of the carbonates and oxides of lead or copper are unsuitable for this purpose, for the reason that a pure oxide, when applied to other metals, will assist in the action of the elements to oxidize the metals they cover. The vehicle of all good paint is boiled or raw linseed oil, and this, when thickened with pigments, covers a less given space; and the material being an oxide, holding more oil than is imparted to the surface to be painted, soon throws off its share and is ready to absorb the air and convey it to the body of the metal, where natural corrosion will take place, and then the two oxides unite chemically. In other words, all paints, in the absence of a solvent, which time soon releases them of, act upon iron or tin as a filter, feeding the porous spots with moisture, like a porous plaster of rust; and as like produces its kind, the decomposed metals work like a happy family, and roll in beds of rust. This fact is observable on flat surfaces, or in gutters where inequalities occur. Here the fine dust or powder collects and keeps the water in them until the oil is decomposed; then the work of oxidation commences.

There is another fruitful source from which rust on the upper or under side of roofing tin comes, and that is, mixing paints in common, cheap oils of kerosene, containing sulphuric acid. This oil never dries. It may harden the film of paint so as to allow the acid it contains to corrode the tin, and the best paint in the world on the opposite side cannot prevent the acid-eaten holes from coming through; and judge the effect, where both sides happen to receive the same potent mixture.

The best paint for tin or iron is composed of pure linseed oil and earthy ochres, red or yellow. The coarser granulated powders are best as a pigment, as they offer less air holes and give a firmer hold for the oil on the grits, and thus bend them to the metal. The oil in this manner gets close to the metal, and offers resistance to the air in removing the atoms from its cohesion. Beware of all metallic oxides, or mineral paints, especially on lofty towers or inaccessible coverings of metal.

Roofing tin should, when laid, be kept clean from windfalls of dust, and painted once in every two or three years, by the day—never by contract. Metals applied in the angles of roofs as flashings, where shingles are laid behind parapet walls, should be well painted, on both sides, and the exposed crevices between the laps putted and painted, and thus cut off leaks in corners "which no feller can find out."

I have known of a case where leaks in an outer wall from an A No. 1 tin roof were undiscovered for years. Carpenters were called, imperfect boards were removed from the exterior wall side, and the whole repainted. Still, there was the leak unabated for years; and at last, the painter being called upon to find out the source of the trouble, found upon examination that the clap-boards on the inner side extended down to the tin, or nearly so, thus preventing the paint from reaching the angle of the tin back of the boards. There the dust collected, and dampness had eaten through, and a ruinous leak was discovered by simply sliding a putty knife under the edge of the siding. Wood work never should be allowed to close down on the metal, but instead, a space of one or two inches should always be left, so that paint can be easily applied to all flashings on all sides, and where the dust can be easily swept out. Many troublesome leaks occur from the base of balustrades shutting down so close that dirt is completely imprisoned, and consequently in time decomposition sets in, and the metal coverings are ruined. Bay windows, with balconies, or with other ornaments, if put on with an idea of permanency, should leave ample room for the painter's brushes to reach every angle, nook, or corner, and thus save a thousand leaks.—*Cor. of California Architect.*

**IMPROVED LACE MACHINES.**—A machine for making laces hitherto produced only by hand work is reported in France. Even old styles of laces, the art of making which has been lost, can readily be reproduced. The machine employs from 1,800 to 2,000 spindles, and from 200 to 300 pins. The *Moniteur des Fil et Tissus* speaks in high terms of the machine and its products, which are said to be fully equal to the best hand-made laces.

**CEMENTING LABELS TO METALS.**—For attaching labels to tin and other bright metallic surfaces, first rub the surface with a mixture of muriatic acid and alcohol; then apply the label with a very thin coating of the paste, and it will adhere most as well as on glass.—*Amateurs' Handbook.*

## To Keep Gun Barrels from Rusting.

The Boston *Journal of Commerce* says: One of the great difficulties which the sportsman has to contend against is the rusting of his barrels, even when protected by the best browning. The alkaline matter existing in snow and in rain, under certain conditions of the atmosphere, works through the best coatings, and reaches the iron. Varnish, as ordinarily laid on, is objectionable, as it gives a gun a "brummagem" look. The best plan is the following: Heat the barrels to the temperature of boiling water (not any hotter, or you may injure them), and rub them with the best copal varnish, giving them a plentiful coating. Let them remain hot for half an hour, and then wipe them clean with a soft rag. In this way you can get enough of the varnish into the pores of the metal to act as a preservative, and, at the same time, no one would suspect that the barrels had ever been touched with varnish. We have applied boiled oil, beeswax, paraffine, and some other substances, in the same way, and obtained good results; but on the whole, we find nothing better than good copal varnish.

## Rust and Corrosion.

The same journal, in speaking of the rust and corrosion of iron in general, says: Iron is easily corroded by even the weak acids. Sulphuric acid, nitric acid and hydrochloric acid all act on it quickly and powerfully. Air and moisture also quickly corrode it. It is a curious fact that carbonate of soda protects iron very perfectly from rust. We have seen a piece of iron that had been kept in a solution of soda for 20 years, and yet was quite bright.

There are several methods of protecting iron from rust. Painting, varnishing, tinning, zincing, etc., have all been tried with good effect. Painting and varnishing need no remarks. Where bright work is to be temporarily protected, however, a paint of white lead and tallow may be used. This will not dry, and may be easily and quickly removed with a little turpentine.

## Destructive War Implements.

Dr. J. H. McLean, of St. Louis, who has expended about \$200,000 for models of implements of war which he claims are so destructive that their practical use in one campaign would force the world into a state of perpetual peace, gave a public exhibition of his inventions at Washington Navy Yard on the 27th ult. About 200 persons were present, including the Chinese Minister and suite, General Benet, Chief of Ordnance; Commander McCormick, of the Bureau of Navy Ordnance; Admiral Scott, Colonel Macaulay, Captain Harrison, Lieutenant Very and many army and navy officers. There were 14 implements on exhibition, but only four of them were tried, and of these only one worked perfectly. The "General Sherman," a small breech-loading cannon, which was expected to fire 26 shots per minute, fired 20 shots in a minute and a half. The "Vixen," built of bronze, fired a one-inch ball once in seven seconds. The "Annihilator," which was intended to fire two charges in a second, fired one in a little less than two seconds. The "Lady McLean," which has 36 barrels with an estimated capacity of nearly 13,000 shots per minute, with a range of three miles, was worked to the speed of 72 shots per second. The other guns were not in order for trial. Among other inventions that Dr. McLean exhibited is a magnetic torpedo propelled by clock-work, and guided to iron ships to be destroyed by a loadstone. The guns were pronounced fairly successful by the officers, but the claim that they would bring on a millennium was by no means admitted.

**A COMPOUND AIR-ENGINE.**—The principle of the compound steam-engine has recently been applied to the working of a compressed-air engine in England, by Col. F. E. B. Beaumont, of the Royal Engineers, and we learn from various accounts that it has proved highly efficient and satisfactory. The engine possesses some peculiar features which render it very economical in the use of compressed air. It has two cylinders, one being much larger than the other. Into the smaller of these the compressed air is taken directly from the reservoir, and after doing its work there it is discharged into the large cylinder, where it is further expanded, being finally discharged into the open air. The admission of air to the smaller cylinder is regulated by an adjustable cut-off apparatus, which admits of maintaining a uniform power under a variable pressure. When the reservoir at first starting contains air at a very high pressure, the cut-off is adjusted so that the small cylinder receives a very small charge of air at each stroke; when the pressure in the reservoir diminishes, the cut-off is delayed so that a large quantity is admitted to the small cylinder; and when the pressure in the reservoir is so far reduced that the pressure on the smaller piston gives it very little power, the supply passages are kept open so that the air acts directly on the piston of the larger cylinder. This arrangement is also available when the air pressure is high and great power is required for a short time, as, for instance, in starting a locomotive. It is, perhaps, needless to mention the advantages a motor of this kind possesses over the steam locomotive. The absence of smoke and noise makes it particularly desirable for tunnels, elevated roads, and, in fact, for any city railroad.

## SCIENTIFIC PROGRESS.

## Detecting Gas Leaks.

Mr. G. F. Ansell, of England, whose death was recently announced, recently applied these principles of his fire-damp indicator in the production of a handy little instrument for detecting gas leaks. The action of Mr. Ansell's fire-damp indicator is founded on the fact that different gasses have different rates of diffusion through a porous body, the velocities of diffusion being inversely as the square roots of their respective densities of the gasses. In the gas-leak indicator this property is taken advantage of as follows: A small chamber is provided, having its back formed by a disk of terra-cotta, this chamber being provided with a small stop-cock, by which its interior can be placed in communication with the outer air. If, when this stop-cock is closed, the indicator be taken into a room where a gas leakage exists, the gas, in virtue of the above-named law of diffusion, enters the chamber through the terra-cotta disk more rapidly than the inclosed air escapes, and the pressure in the chamber consequently rises. This increase of pressure is utilized to move a hand on a dial at the front of the instrument, each pressure corresponding to a certain percentage of gas in the atmosphere in which the indicator is placed. The dial is graduated from 0 to 35% of gas, and is moreover marked to show when the mixture is and is not explosive. The instrument is very sensitive and prompt in its action, and it is calculated to serve a very useful purpose.

**MANGANESE METAL IN THE ARTS.**—The Germans appear to be making extraordinary efforts to extend the uses of manganese in various forms. As the displays of various works at the Dusseldorf exhibition showed, they are now manufacturing not alone high-grade ferro-manganese, but also almost pure metal and its alloys. The high price, due to the difficulty of reducing manganese from its ores, makes the use of the highest grades of manganese for steel impossible, but the Isabellen-Huette, at Dillenburg is making a material running as high as 94% of manganese for special purposes. They use it in the preparation of various alloys of manganese and copper, used in the refining of copper and the manufacture of manganese, bronzes, brass, etc. While phosphor copper and phosphor tin must be added to bronze with great care, in order to prevent an injurious action upon the tenacity and ductility of the metal, and while phosphor bronze does not stand repeated re-melting without parting with its phosphorus, manganese can be added to the extent of 10% and forms a part of the alloy. The manganese copper, generally used for improving the quality of bronzes, brass, etc., contains 30% of manganese. The Isabellen-Huette produces also an alloy of 89% of copper and 11% of manganese, which, cast in sand, shows a high tenacity and ductility, and replaces copper in some respects. No tin whatever is added, and it is believed that this manganese and copper alloy may be used for guns, etc. The pure manganese metal, a mass which crumbles easily, has been tried with much success in the Mansfield copper district for refining, and there are prospects of its adoption for this purpose as soon as the price has been somewhat reduced.

**THE ATMOSPHERE OF CELESTIAL BODIES.**—M. Jose J. Landeur communicates an interesting paper to *Les Mondes* on the atmosphere of celestial bodies. Whereas previous investigations have given about 250 miles as the furthest result for the height of the earth's atmosphere, M. Landeur places it at not less than 22,000 miles. He corroborates his calculation by showing that the light at which meteoric matter becomes incandescent on approaching the earth is far beyond the distance heretofore assigned to it, and therefore there must be an atmosphere at that greater distance to produce the incandescence. He also accounts for the spectrum of the aurora borealis, showing a marked coincidence with that of the zodiacal light by the theory that since the earth travels in the zodiacal nebula from September to May, the rarified atmosphere beyond the earth's heavy envelop of air must absorb some of the constituent elements of the zodiacal nebula, and thus these elements make their presence apparent in the spectrum of the aurora, which phenomenon occurs in this rarified outer envelop. M. Landeur believes also that the difference between the observed acceleration of the moon's mean movement and that obtained by calculation on any of the previously advanced hypotheses, which is very marked, may be wholly explained by the resistance of this nebula in the moon's movement.

**RECTIFYING ALCOHOL.**—If a quantity of 40% to 50% alcohol is placed into a retort and a vacuum is created in this retort by means of an air pump, and the retort is placed into or in connection with the cooler of an ice machine, the alcohol will be evaporated. As the evaporation of the alcohol causes the temperature of the retort to drop below the surrounding temperature, the warmth of water at an ordinary temperature will be sufficient to evaporate the alcohol, and the same can be rectified without the use of fuel.—*R. Pictet, in Revue Univ. de la Brass et Dist.*

**LIVE STEAM.**—The experiment of delivery of "live steam," from a central source, appears to have met with good success in the enterprise of the Hartford Steam Company. The Hartford Post, which has tested the steam for heating and power, says: "It is found that the heating is very thorough, and that as motive power it has decided advantages. The steam delivered to the engine is thoroughly dry, and is found more effective than that made on the premises when showing the same gauge pressure. Using the same pressure of steam it is found that the presses can be run faster than on the old supply, and with a uniformity of speed that is very desirable, and is an advance on any results previously obtained. One special advantage is the almost absolute uniformity of the pressure and in connection with the positive advantages there is to be noted the absence of dirt, dust and ashes, and the great convenience of merely opening or shutting a valve in place of attending to the firing and water supply of a furnace and boiler. After several days trial it seems sufficiently evident that the new departure is a success in both of its applications."

**BLEACHING BY THE ELECTRIC LIGHT.**—M. Leon Manet has devised a process for bleaching hood aluminen by means of the electric light. The aluminen is taken after separation, and either before or after drying. It is then exposed to the light. The inventor arranged electric lights fitted with lenses or reflectors, so as to cast their light upon the aluminen which is to be bleached. If it is still liquid the light is thrown upon the plates or trays which contain it in the drying stove. These plates may be made of glass, so as to let the rays pass through them. If the aluminen is dry the light can be thrown upon layers of the article arranged upon the stage. In either case the process varies in duration, according as the aluminen has been more or less completely separated from the clot. Under ordinary circumstances 24 hours will suffice to bring about a perfect decoloration. For more efficacy the electric light may be brought into action at the beginning of the process, when the clot and the aluminen are being separated.

**NOVEL EXPERIMENT.**—The Port Jarvis, N. Y., *Gazette* says: An odd-looking car has been running over the eastern part of the Erie road recently. The top of the car was covered with wind-mills and revolving cups, so that it looked like the roof of a signal service station. The object, it is said, was to test the pressure of the atmosphere on cars going at different speeds, so as to determine of what shape to make the front of the cars to best resist this pressure, which is very great. The sloping, curved end of the mansard-roofed cars was found to be the best, and the more curves at the end of the car the less was the atmospheric resistance, according to the experiments made.

**EFFECT OF COLD ON MAGNETIZED STEEL.**—A recent investigation conducted in the physical laboratory of Harvard University has led to the discovery of the remarkable fact that intense cold can deprive magnetized steel bars of nearly all the magnetism which may have been imparted to them. The intense cold was produced by solid carbonic acid. This fact has an important bearing upon observations of the magnetic condition of the earth taken in high latitudes; for what appear to be daily and yearly changes in the earth's magnetism may be due in large part to conditions of temperature, which affect the magnets used in the observations. It also must be concluded that the molecular condition of steel is changed by great cold.

**THE SENSE OF COLORS.**—At a recent meeting of the French Association for the Advancement of Science, M. Carpentier, of Nancy, read a paper, in which he propounded the somewhat novel theory that the sense of light and that of colors are independent. Since white light is the sum total of the various colors, it has been commonly thought that the sensation of white light was simply the sum total of the sensations of its constituent colors. On the ground that the sensitiveness of the eye for white light may be increased—as, for instance, by the previous absence of all light—without the sensitiveness for color being increased, he urges that there is a color sense as distinct from that of light as is the sense of touch from the sense of heat.

**ELECTRIC TIDES.**—Mr. Alexander Adams, of the English Postoffice Telegraph Department, reports that he has observed the existence of electric tides in telegraph circuits. By long continued observations he has determined distinct variations of strength in those earth currents which are invariably present on all telegraphic wires, following the different diurnal positions of the moon with respect to the earth. He read a paper on the subject at a recent meeting of the Society of Telegraph Engineers.

**MICROSCOPIE MACHINERY.**—Machines in a watch factory will cut screws with 589 threads to the inch—the finest used in the watch has 250. These threads are invisible to the naked eye, and it takes 144,000 of the screws to weigh a pound. A pound of them is worth six pounds of pure gold. Lay one upon a piece of white paper, and it looks like a tiny steel filing.

**A NEW SAFETY LAMP.**—Dr. Irvine, of Glasgow, has invented a new safety lamp, which is so constructed as to emit a loud sound when an explosive mixture of gas and air enters it; by this means the existence of fire-damp in collieries is readily indicated.



### Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 10.	Week Ending Mar. 17.	Week Ending Mar. 24.	Week Ending Mar. 31.
Alma.....	2.25	2.65	2.25	2.30
Alta.....	2.20	1.80	1.50	1.60
Andes.....	1.40	1.20	1.10	1.10
Albion.....	1.30	1.10	1.20	1.10
Argenta.....	2.00	1.50	1.20	1.20
Atterbury.....	1.00	1.00	1.00	1.00
Belcher.....	1.05	80c	1.00	1.15
Belmont.....	1.00	1.00	1.00	1.00
Best & Belcher.....	1.00	1.00	1.00	1.00
Bidwell.....	1.00	1.00	1.00	1.00
Bodie.....	1.00	1.00	1.00	1.00
Benton.....	1.00	1.00	1.00	1.00
Bulwer.....	1.00	1.00	1.00	1.00
Boston.....	1.00	1.00	1.00	1.00
Black Hawk.....	1.00	1.00	1.00	1.00
Belvidere.....	1.00	1.00	1.00	1.00
Booker.....	1.00	1.00	1.00	1.00
Caledonia.....	1.00	1.00	1.00	1.00
California.....	1.00	1.00	1.00	1.00
Challenge.....	1.00	1.00	1.00	1.00
Chollar.....	1.00	1.00	1.00	1.00
Confidence.....	1.00	1.00	1.00	1.00
Con Imperial.....	1.00	1.00	1.00	1.00
Con Virginia.....	1.00	1.00	1.00	1.00
Oron Point.....	1.00	1.00	1.00	1.00
Columbus.....	1.00	1.00	1.00	1.00
Champion.....	1.00	1.00	1.00	1.00
Concordia.....	1.00	1.00	1.00	1.00
Concordia (Val.).....	1.00	1.00	1.00	1.00
Con Pacific.....	1.00	1.00	1.00	1.00
Derbec.....	1.00	1.00	1.00	1.00
Dawson.....	1.00	1.00	1.00	1.00
E. Mt. Diablo.....	1.00	1.00	1.00	1.00
Eureka.....	1.00	1.00	1.00	1.00
Exchequer.....	1.00	1.00	1.00	1.00
Endowment.....	1.00	1.00	1.00	1.00
Grand Prize.....	1.00	1.00	1.00	1.00
Golden Gate.....	1.00	1.00	1.00	1.00
Goodshaw.....	1.00	1.00	1.00	1.00
Gould & Curry.....	1.00	1.00	1.00	1.00
Hale & Norcross.....	1.00	1.00	1.00	1.00
Head Center.....	1.00	1.00	1.00	1.00
Hussey.....	1.00	1.00	1.00	1.00
Independence.....	1.00	1.00	1.00	1.00
Juba.....	1.00	1.00	1.00	1.00
Justice.....	1.00	1.00	1.00	1.00
Jackson.....	1.00	1.00	1.00	1.00
Jupiter.....	1.00	1.00	1.00	1.00
Kentucky.....	1.00	1.00	1.00	1.00
Kossuth.....	1.00	1.00	1.00	1.00
Lady Bryan.....	1.00	1.00	1.00	1.00
Lady Wash.....	1.00	1.00	1.00	1.00
Leviathan.....	1.00	1.00	1.00	1.00
Leadville.....	1.00	1.00	1.00	1.00
May Belle.....	1.00	1.00	1.00	1.00
Modoc.....	1.00	1.00	1.00	1.00
Manhattan.....	1.00	1.00	1.00	1.00
Martin White.....	1.00	1.00	1.00	1.00
McClinton.....	1.00	1.00	1.00	1.00
Mono.....	1.00	1.00	1.00	1.00
Mexican.....	1.00	1.00	1.00	1.00
Mt. Diablo.....	1.00	1.00	1.00	1.00
Morning Star.....	1.00	1.00	1.00	1.00
Mt. Potosi.....	1.00	1.00	1.00	1.00
Noonday.....	1.00	1.00	1.00	1.00
New York.....	1.00	1.00	1.00	1.00
Northern Belle.....	1.00	1.00	1.00	1.00
North Star.....	1.00	1.00	1.00	1.00
Navajo.....	1.00	1.00	1.00	1.00
Occidental.....	1.00	1.00	1.00	1.00
Ophir.....	1.00	1.00	1.00	1.00
Original Keystone.....	1.00	1.00	1.00	1.00
Overman.....	1.00	1.00	1.00	1.00
Oro.....	1.00	1.00	1.00	1.00
Paris.....	1.00	1.00	1.00	1.00
Potosi.....	1.00	1.00	1.00	1.00
Queen Bee.....	1.00	1.00	1.00	1.00
South Butte.....	1.00	1.00	1.00	1.00
Savage.....	1.00	1.00	1.00	1.00
Seg Belcher.....	1.00	1.00	1.00	1.00
Sierra Nevada.....	1.00	1.00	1.00	1.00
Sierra Hill.....	1.00	1.00	1.00	1.00
Silver King.....	1.00	1.00	1.00	1.00
Succor.....	1.00	1.00	1.00	1.00
Summit.....	1.00	1.00	1.00	1.00
Scorpion.....	1.00	1.00	1.00	1.00
Solid Silver.....	1.00	1.00	1.00	1.00
South Bodie.....	1.00	1.00	1.00	1.00
South Standard.....	1.00	1.00	1.00	1.00
Syndicate.....	1.00	1.00	1.00	1.00
Tioga Con.....	1.00	1.00	1.00	1.00
Tip-top.....	1.00	1.00	1.00	1.00
Tuscarora.....	1.00	1.00	1.00	1.00
Union Con.....	1.00	1.00	1.00	1.00
Utah.....	1.00	1.00	1.00	1.00
Ward.....	1.00	1.00	1.00	1.00
Wales.....	1.00	1.00	1.00	1.00
Yellow Jacket.....	1.00	1.00	1.00	1.00

### Sales at S. F. Stock Exchange.

Thursday A.M. Mar. 31.	100 Union.....	60c
120 Alta.....	280 Yellow Jacket.....	3.30
310 Andes.....	250 Argenta.....	2.00
50 Alpha.....	600 Argenta.....	2.00
250 B & Belcher.....	1500 Albion.....	1.10
300 Belcher.....	500 Bechtel.....	55c
400 Bullion.....	100 Caledonia.....	80c
50 Benton.....	100 Concordia.....	80c
125 California.....	100 Day.....	40c
220 Con Virginia.....	20 Eureka.....	25c
220 Chollar.....	30 Grand Prize.....	50c
250 Con Imperial.....	100 Head Center.....	75c
250 Crown Point.....	100 Giant & O.A.....	3.40
200 Exchequer.....	100 Jupiter.....	15c
200 Gould & Curry.....	100 Kentuck.....	15c
100 Golden Gate.....	100 Leadville.....	93c
115 Hale & Nor.....	500 Mt Potosi.....	15c
125 Justice.....	50 Mono.....	1.10
100 Kentucky.....	100 Mt White.....	5c
50 Mexican.....	150 N Belle Is.....	30c
100 New York.....	250 Nevada.....	1.10
145 Ophir.....	100 Navajo.....	1.35
800 Overman.....	50 Noonday.....	1.80
270 Savage.....	185 Oro.....	75c
250 Seg Belcher.....	50 Paris.....	60c
350 Silver Hill.....	100 Star.....	15c
150 Silver King.....	50 Silver King.....	33c
500 Tioga Con.....	100 Tioga Con.....	40c
150 Utah.....	50 Tip-top.....	4c
70 Wales.....	70 Wales.....	85c

**ELECTRIC LIGHT IN MINES.**—We see by the *Oroville Register* that the balance of the machinery for the electric light to be used at the Spring Valley company's mine, has arrived at its destination at Cherokee. There will be four of these lights used at the mine, each of 8,000 candle power. When fully in operation the night work of the mine can be prosecuted with the same vigor and safety that it can by daylight. Mr. Walder, the Superintendent of the company, is a man of energy and infinite resources, and, withal, intensely practical in his ideas; hence, whatever operation he inaugurates to facilitate the working of the mine we shall have a great deal of confidence in.

A DISPATCH from Seattle, W. T., on March 29th says: Captain Blasdel, a San Francisco coal expert, left here this morning en route for Queen Charlotte island, for the purpose of examining extensive anthracite coal beds said to have been discovered there.

### MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

#### ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Nevada	20	50	Mar 5	Apr 12	May 3	W H Watson	302 Montgomery st
Andes S M Co	Nevada	16	25	Mar 1	Apr 7	Apr 29	B Burris	309 Montgomery st
Argenta S M Co	Nevada	7	25	Mar 1	Apr 4	Apr 5	E M Hall	327 Pine st
Belcher S M Co	Nevada	26	50	Feb 15	Mar 19	Apr 9	J Crockett	327 Pine st
Best & Belcher M Co	Nevada	20	50	Mar 1	Apr 13	Apr 13	J W Pew	309 Montgomery st
Belmont M Co	Nevada	23	10	Mar 8	Apr 19	May 17	J W Pew	310 Pine st
Bullion M Co	Nevada	18	100	Feb 28	Apr 5	Apr 26	J M Brazell	323 Montgomery st
East Noonday M Co	California	1	10	Feb 18	Mar 18	Apr 16	C V Hubbard	310 Pine st
Caledonia S M Co	California	34	25	Mar 5	Apr 9	Apr 23	R Wegener	414 California st
Confidence S M Co	Nevada	12	50	Feb 12	Mar 13	Apr 7	R Wegener	414 California st
Crown Point G & S M Co	Nevada	45	50	Mar 23	Apr 29	May 25	Jas Newlands	327 Pine st
Hale & Norcross M Co	Nevada	68	50	Mar 9	Apr 9	Apr 14	J F Lightner	309 Montgomery st
Justice M Co	Nevada	34	25	Mar 28	Apr 29	May 21	R E Kelley	419 California st
Leeds M Co	Nevada	12	25	Mar 23	Apr 25	May 17	F A Fritsch	330 Pine st
Mexican M Co	Utah	4	15	Feb 2	Mar 14	Apr 11	D B Chisholm	327 Pine st
Northern Light M Co	Nevada	15	50	Mar 16	Apr 21	May 11	C L McCoy	309 Montgomery st
Overman M Co	California	7	15	Mar 2	Apr 6	Apr 27	F S Monroe	310 Pine st
Occidental Con G M Co	Nevada	4	50	Mar 17	Apr 21	May 12	G D Edwards	414 California st
Ophir M Co	California	6	04	Feb 21	Apr 21	May 13	T Smith	402 Montgomery st
Oro M Co	Nevada	39	100	Mar 9	Apr 14	May 4	C L McCoy	309 Montgomery st
	California	3	30	Feb 9	Mar 14	Apr 5	W Stuart	320 Sansome st

#### OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Amelia G M Co	California	1	10	Mar 14	Apr 22	May 17	J B Leighton	527 Clay st
Black Hawk G M Co	California	11	10	Mar 1	Apr 22	May 17	H A Charles	403 California st
Belvidere M Co	California	10	25	Feb 18	Mar 24	Apr 16	C V Hubbard	310 Pine st
Brooklyn Con M Co	California	1	05	Feb 21	Mar 23	Apr 18	J T McGehegan	318 Pine st
Carbora M Co	Mexico	3	10	Feb 16	Mar 18	Apr 2	T P Holmes	309 Montgomery st
Deland M & S M Co	California	1	05	Mar 23	Apr 22	May 16	J M Main	323 Montgomery st
Goodshaw M Co	California	8	15	Feb 18	Mar 24	Apr 13	A F Main	319 California st
Golden Fleece G M Co	California	20	30	Mar 2	Apr 3	Apr 29	F R Schirmer	755 Filson st
Golden Gate Con H M Co	California	4	50	Mar 28	Apr 3	May 25	J T McGehegan	318 Pine st
Grand Prize M Co	Nevada	4	40	Mar 24	Apr 19	May 12	D L Thomas	325 Pine st
Harlow M & S M Co	California	15	25	Mar 9	Apr 9	Apr 26	D B Chisholm	327 Pine st
Elmhurst G M Co	California	6	05	Mar 12	Apr 18	May 9	H Kuntz	209 Sansome st
Hale M & S M Co	California	7	40	Feb 18	Mar 24	Apr 20	W Van Bokkelen	California st
Florida Hill M Co	Idaho	3	30	Mar 17	Apr 25	May 17	R Wegener	414 California st
Idaho M Co	Nevada	12	10	Jan 23	Mar 12	Apr 7	A Adler	76 California Market
Ivanpah M Co	California	10	10	Mar 5	Apr 9	Apr 26	E J Friedlander	309 California st
Jupiter M Co	California	12	25	Mar 19	Apr 22	May 17	E C Masten	309 Montgomery st
Mayhew Con M Co	California	7	10	Mar 9	Apr 14	May 9	W J Taylor	310 Pine st
Mayland Con M Co	California	2	25	Sep 15	Apr 22	May 9	E P Farnsworth	219 Sansome st
Mono M Co	California	11	10	Mar 17	Apr 22	May 12	W H Hunt	309 Montgomery st
McElroy Gravel M Co	California	5	10	Mar 8	Apr 13	May 3	L Lillie	607 Washington st
Mammoth M Co	California	7	25	Feb 19	Mar 14	Apr 11	A W Rose	327 Montgomery st
Martin White M Co	Nevada	9	25	Mar 19	Apr 22	May 12	J J Scoville	309 Montgomery st
New York M Co	Nevada	25	10	Feb 18	Mar 24	Apr 11	David Wilder	310 Pine st
Original Keystone M Co	Nevada	4	25	Mar 19	Apr 22	May 12	F E Lutz	330 Pine st
Oakland G M Co	California	14	05	Feb 24	Mar 28	Apr 15	R D Hopkins	436 Montgomery st
Real Del Monte M Co	Nevada	14	25	Jan 31	Mar 5	Mar 28	C V Hubbard	310 Pine st
Rocky Point M Co	California	7	5	Mar 19	Apr 25	May 16	W Hughes	330 Pine st
Real Del Monte M Co	California	15	50	Mar 23	Apr 25	May 20	C Van Hubbard	310 Pine st
Syndicate M Co	California	3	25	Feb 15	Mar 23	Apr 12	J Stadfield	419 California st
South Hite M Co	California	1	25	Feb 15	Mar 23	Apr 12	F A Berlin	315 California st
San Pedro M Co	California	3	03	Feb 21	Mar 25	Apr 15	W G Holmes	328 Montgomery st
Trojan M Co	Nevada	13	10	Mar 7	Apr 11	May 2	E C Masten	309 Montgomery st
Tilden M Co	Nevada	1	10	Mar 12	Apr 11	May 13	E C Masten	309 Montgomery st
Union Con M Co	Nevada	16	10	Mar 7	Apr 11	May 2	J M Buffington	309 California st
Utah Extension M Co	Nevada	1	13	Feb 24	Mar 26	Apr 15	W Ressayre	120 Sutter st
Vanderhill M Co	Nevada	2	10	Feb 5	Mar 14	Apr 4	J Morio	328 Montgomery st
Wide Awake M Co	Arizona	12	10	Feb 17	Mar 25	Apr 6	C Hildebrandt	232 Sutter st

#### MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Phoenix M Co	California	D B Chisholm	327 Pine st	Annual	Apr 4
Wade M Co	Nevada	W H Allen	306 Pine st	Annual	Apr 6

#### LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Mar 21
Elmer De Smet M Co	Idaho	H D De Smet	309 Montgomery st	50	Mar 15
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	50	Mar 15
Silver King M Co	Arizona	J Nash	315 California st	75	Mar 15
Standard Con M Co (2)	California	Wm Willis	309 Montgomery st	75	Mar 12
Western M Co	California	C S Curtis	309 Montgomery st	75	Mar 2
Navajo M Co	Nevada	E M Hall	327 Pine st	75	Mar 25

#### Mining Share Market.

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made is regarded as a very valuable property. It was removed on Thursday that San Francisco parties had telegraphed an offer of \$10,000 for the Jackson, but the owner could not be traced to accept reliable source. It is known, however, that Messrs. Ryan & Marshall have refused an offer of \$10,000 for the property, but from what source the offer came we could not learn.

#### NAPA.

**MR. COFFMAN'S MINE.**—Napa, Register, Mar. 29: Wednesday Mr. A. C. Coffman brought into our office several pieces of gold and silver bearing reliable source. The mine is in the hill back of his house northeast of town. He has commenced a tunnel near the base of the hill, and will on the first of next month commence work in earnest, having employed an old and experienced miner to prove the claim. Mr. Coffman has had at different times, and by different parties, 3 assays made, the rock yielding in silver \$22.50, \$23.65 and \$20 to the ton. If he has any great quantity of this kind of rock, and he thinks he has, he has a good thing, as it pays well to work rock yielding but \$10 a ton.

#### NEVADA.

**A BIO CLEAN-UP.**—Transcript, Mar. 23: The clean-up from 504 tons of ore from the Chamonix mine, at Canada Hill, was made Monday at the Pioneer mill. The result was a little over \$3,000 in free gold and nearly \$1,000 worth of sulphuric acid. The average yield per ton, including sulphuric acid, was a little over \$90.

**PROMISING PROPERTY.**—After the tunnel of the Chamonix mine, which is now in 2,000 ft, has advanced about 25 ft further, stopping will begin. Recent developments have been of such a character that it is said to be the purpose of the company to put up a stamp mill this season. The tunnel is one of the finest pieces of work of the kind in the State. It extends most of the way through hard rock over 6,000 ft of time and \$35,000 in money have been consumed in running it. The splendid success of the Providence, Merrifield, Wyoming and other great mining enterprises in that immediate vicinity, are indicative that the enterprise and persistency of the Chamonix folks will, before many months, be rewarded by substantial returns.

**A FAIR CLEAN-UP.**—Lewis Wheeler & Co., who recently purchased the hydraulic claim at Scott's Flat, formerly owned by Sam Jordan, have just made their first clean-up. Considering all the circumstances, the result was pretty fair.

**THE PRICE PAID.**—We are informed that the Eureka Lake company paid Cowger Bros. the sum of \$12,000 for their hydraulic claim at Snow Point, this county.

**THE PROVIDENCE MINE.**—The new 40-stamp mill of the Providence Mining company, for which ground was broken Monday, will be put up on the site of the old Monnier reduction works, between the hoisting works and the present 20-stamp mill. The wood-work will be done by the company, while the iron work will be executed by George G. Allan, of the Nevada foundry. The mill will contain the most approved modern appliances. It is expected that the mill, which is to be run by water power, will be completed within the next 70 days. The company have recently purchased the Williams ground, which is the location of their new shaft on the hill. In order to develop this ground it will, we understand, be necessary, to erect new hoisting works before many months have elapsed.

**THE BANNER MINE.**—Work is being prosecuted vigorously at the Banner claim, and the prospecting operations have thus far proven reasonably encouraging. A drift to the north has been started at the 200 level, and is now in 15 ft. Sinking for the 300 level is going on as usual.

**SAILOR FLAT MINE.**—The Sailor Flat hydraulic mining company, at Blue Tent, will next week begin to make their first clean-up for the present season. A large amount of gold will doubtless be realized.

**BLUE TENT MINE.**—Though little is generally known regarding present operations at the Blue Tent hydraulic mine, we are assured that a golden harvest is being reaped.

**THE MURCHIE MINE.**—The foundation for the pump engine at the new shaft of the Murchie mine is being laid, and will soon be completed. The ages will be put in a few days, and by next month the operations will be under full headway. The luncheon for the new 20-stamp mill on the ground, and the prospecting inside of 10 weeks the shaft will be down. George G. Allan has the contract for erecting the mill. A fine 4-ft ledge show in the bottom of the shaft, and several tons of it already on the dump shows it to be fully as rich as any development ever made in the mine. Some of this ore will pay \$400 a ton, it is thought by good judges.

**CISCO COX.**—The Superintendent of the Cisco Con. mining company states that no damage has been done to the buildings or retaining the heavy fall of snow and rain during the winter; and that the snow is now fast disappearing, and that the indications are that the season will open from 1 month to 6 weeks earlier this spring than last. Estimates are being prepared for 30 additional stamps for their mill, which will be added as soon as work can be properly done.

#### PLACER.

**THE SKASON.**—Placer Times, Mar. 20: The present season promises to be a profitable one with the miners of this section. All the different claims, with very few exceptions, are being worked in this vicinity. The Little York, York Bet, Lowell Hill, Dutch Flat and other hydraulic mines are nearly all mined and work is being pushed with the prospect of a good, long season's run.

At Dutch Flat the Polar Star hydraulic mine works a crew of 50 men, and we understand, the same company contemplates soon to commence work in their other hydraulic claim, the Southern Cross, with a good force of men.

The Baker is being worked by a full set of hands, and a night shift. Several men are at work for the same company, washing out the tailings in the Dutch Flat canyon. A night shift is also employed in the work.

J. H. LARSON has a lot of men at work in his claim, but it is not so extensive as any of the others in this locality.

**UNDERCURRENTS.**—The undercurrents in Beal's canyon, owned by Mr. Beal, of San Jose, and under the management of Adams Barrett, of this place, are doing good service in catching and retaining the fine gold being sluiced through the canyon by the Cedar Creek company.

The Gold Run & Miners' Ditch company's claim, at Gold Run, is being worked by several men, as is, also, the New Gold Run claim, at the same place. There are other important claims in the same vicinity of which Col. Moody, W. H. Kinder's and others, are all being worked to advantage.

C. H. CARR, who has a lot of flumes and undercurrents in Squier's canyon, has several men at work overhauling and reworking the large deposit of tailings along the line of his flumes.

V. CURRAN has 2 well-arranged sets of undercurrents at the dump end of the Polar Star tunnel, which he is kept busy in attending to. He expects to realize handsomely during the season's run of Polar Star, by catching the fine gold that will pass the one undercurrent belonging to the company.

All the drift mines at Lowell Hill, Steep Hollow and Remington Hill are being worked with better and more promising results than ever before, taking the whole lot on an average.

A. LARSON has commenced work extending the tunnel in the Shady Glen mine, at Alta. He proposes cutting the tunnel much deeper this season, and will drift mine some, also.

The quartz section of Euchre bar and Humboldt canyon is being more thoroughly prospected this spring. A large number of claims have been located on the ledge, and more are being staked off by new parties who have been attracted that way by the favorable showing and report recently obtained. A large amount of work will be done, and considerable money expended in that section this season, in the way of developing the many claims that have been and are being taken. In fact, past developments go to prove that this will be one of the most important quartz mining sections in Placer county in a very short time.

We are informed that the Poole company propose making an addition to their quartz mill of 5 more stamps, making the mill, after the addition, a 10-stamp instead of a 5-stamp mill. The present mill was put up to experiment with, but now no more doubts are entertained as to the paying quality of the ore.

TAKE IT ALL IN THE MINING OUTLOOK for this section was never more promising than at the present time.

**GRAVEL.**—Placer Argus, Mar. 20: It is reported on good authority that the Golden Gate mine, at Damascus, is yielding very rich gravel. It will be remembered that 3 years ago the old channel was lost, and the owners, in prospecting for it, ran a slope near the face of the lower tunnel (if below the face is about 15 miles from the mouth of the tunnel), which resulted in the finding of a new channel containing entirely different gravel from what had been previously found in the mine. A large overshot wheel, 20 ft in diameter, was erected at the top of the slope. The wheel is furnished with water from the upper tunnel, and serves to raise the ore up the slope, where they are pulled outside by horses. The owners are entitled to a fortune for the energy which they have exhibited.

#### PLUMAS.

**SENAT.**—Greenway Bulletin, Mar. 20: The upper tunnel is now in a distance of 100 ft. The mine shows a ledge of 64 ft in the face of the drift.

**ARCADIAN.**—The contract will be let this week for running a tunnel some 500 ft in length. The rock is of good quality, and will pay well.

**INDIAN VALLEY.**—The track in the long tunnel is being laid rapidly, and work pushed forward as fast as possible, in order to hasten the day for starting the new mill. The tunnel is a little over 1,300 ft in length, and is being put in such complete order as to cause no delay or stoppage after the mill starts. The ore now developed is exceedingly rich, and sufficient in quantity to keep the mill in operation for a long time.

**GRANITE BASIN.**—Rev. A. P. White gave us a call on Friday evening, on his way from Granite Basin to Susanville, for which place he left next morning. He gives a very encouraging report of mining affairs at the Basin, and expects to see lively times there as soon as the snow goes off, so that mills can be brought in and started up. There are several of the mines already hounded, and some have recently been sold. We shall look for active operations and good reports from Granite Basin the coming summer.

#### SAN BERNARDINO.

**SILVER.**—Colton Semi-Tropic, Mar. 20: We have seen some very rich specimens of silver ore from the old Lee mine, on the Mohave, now owned by R. W. Waterman, of the Warm Springs.

Work is still going on prospecting the Silver Mountain mine. Prospects look more and more favorable, and we have good hopes of a bonanza right at our doors.

#### SAN DIEGO.

**SOLD.**—San Diego Union, Mar. 24: The Ready Relief mine, at Banner, has been sold to parties who will remove active operations upon it.

#### SAN MATEO.

**PROSPECTING.**—Journal, Mar. 24: The work of prospecting the deep well at the water-works in this city, for mineral, has fairly been commenced. On Monday, Miller, Rowley & Co. started up the engine, and the steamer of the city, under the command of the engineer, was put in the water. The hand pump was first put in the well, and, to the agreeable surprise of the parties, the well was found intact, the deposit of sediment in the bottom being much less than calculated on. Drilling in the bottom of the well is now being done and the rock saved for future assay. Rock will also be taken from the sides of the hole above at various depths and tested for the metallic silver which the original samples show it contained.

#### SIERRA.

**SAVAGE.**—Mountain Messenger, Mar. 26: The owners of the Savage mine are preparing to resume work.

**BRUSH CREEK.**—The Brush Creek mine is soon to be started up by a company yet to be named.

**SOLD.**—The latest report is that the Hunter's claim has been sold with the Bonanza and the money paid.

**NGOET.**—A piece of gold weighing 33 ounces was found in the Bald Mountain mine last week. It was about the shape of and nearly as large as one's hand.

**RICH QUARTZ.**—In what are known as Busch's hydraulic diggings, just below Loganville, a very rich quartz ledge was uncovered a short time ago.

#### TRINITY.

**NEW RIVER.**—Cor. Trinity Journal, Mar. 24: We are having splendid weather for mining now, and as this spring's run of water will likely get out earlier than usual, everybody hereabouts is rushing the gravel through wonderful activity, and the prospects at this time are fair for a good showing when the final clean-up for the season is made. Messrs. White & Buckley, of the Slide Creek company, have also 2 men on the Eagle Creek claim. This claim is well rigged with iron pipe and a giant. On the Slide Creek claim no work has been done this winter in the shape of mining, with the exception of a week's run in the water, which was a success. The water, they showed an average of \$20 a day. Undoubtedly the best claim on the river now is that of Corson & Donald, but they have a very small bead of water, enough, however, to prospect the claim well. This they have done to their satisfaction. Whenever they had a sufficient head of water for sluicing during the heavy rains, they made on an average \$10 a day to the man. Last week they surveyed the ditch from a gulch 15 miles above their claim, and this will give them, when dug, all the water needed for 7 or 8 months in the year. At present they are building a flume across the river, which will be some 80 ft high, with a span of 70 to 80 ft. For the present they are only going to take the water on Cape Horn bar, and mine thereon until summer; then when water gives out they will dig the ditch to their claim. Both parties are young, stout men and intend to make a state at mining, and they are certainly going about it in the right way.

#### TUOLUMNE.

**ALABAMA MINE.**—Tuolumne Independent, Mar. 24: The Alabama mine, on the new ledge, has improved 20% the last 3 weeks. The manager, Mr. John Dart, is expected to fully 20% of the ledge, running north; so keeps the full capacity of the 40-stamp mill constantly employed. Gold is in sight in the west face.

**GEM.**—The Gem mine, Mr. Harris', is keeping its 10-stamp mill crushing regularly. The mine never looked better than at present.

The New Albany mine, on the North Fork of the Tuolumne, is carrying on its work by contract. A new vein mine, in showing very promising looking rock.

We hear that the north extension of the Chapparral mine has been discovered, and pay rock found. The Markham mill, on Big creek, has been purchased of the foundry and will be put in place at an early day.

**STRICK.**—A rich quartz strike was made by A. Gdon and J. Nash, west of the Lost Log, Friday. They say about 100 tons of rock was discovered, it sprinkled with gold. Tons of the same quality were found near, and on Saturday they found the ledge, not far distant, some 3 ft thick. The rock is a queer conglomerate, and would be passed by every miner in the country as worthless. It is full of antimony, and on dipping a hand in the water in which the crushed rock is washed, the water is so greasy that it coats the hand. As the assay was made, it was found to be composed of dry of moisture. The rock will have to be crushed, the expense of roasting is not considered a serious matter. The rock resembles limestone, and shows that gold is where you find it.

#### YUBA.

**THE SOLO-MINES.**—Marysville Appeal, Mar. 25: Mr. Frank, the manager of the Solo mines at Brown's valley, 12 miles from this city, was here yesterday. A 10-stamp mill was built at Brown's valley a year ago, and through the summer and fall the company was busily engaged working the claim. An incline led to several levels, and for a while profitable rock was found and the ledge fol-

lowed, but the incline led away from the pay chimney and a shaft will have to be sunk. The water in the mine gave some trouble, too, on account of the scarcity of wood and the mine was stopped, to be commenced again in the summer. Then an attempt was made to work the adjacent Reliable claim, high up the hill, but this was a failure. They are now working the Flag claim, three-quarters of a mile above Brown's valley, having moved the hoisting works to that place and sunk an incline to the depth of 120 ft. The mill has not been moved, but rock much richer than that of the Solo has been found, and crushing will be commenced next week. The rock found is expected to yield \$100 to the ton, besides 15% or 20% sulphuric acid. Mr. Frank confidently expressed the belief that in a month the developments will create excitement at Brown's valley.

#### NEVADA.

##### WASHOE DISTRICT.

**UNION CON.**—Virginia City Enterprise, Mar. 27: On the 2500 level the joint Mexican cast crosscut has been extended 35 ft, and the joint Sierra Nevada winze has been sunk and timbered 10 ft.

**ALTA.**—During the past week we sunk and timbered the shaft 30 ft, total depth 1,885 ft.

**C. & C. SHAFT.**—Cutting out a hoh station at the 2100 level, and cutting out a working station at the 2500 level.

**TOTAL DEPTH.**—The shaft below the 2500 level, 24 ft.

**UNION SHAFT.**—The shaft has been sunk and timbered 8 ft during the past week. The relief pump at the 2000 level is connected.

**MEXICAN.**—On the 2700 level joint Union Con. drill hole No. 2 has been extended 200 ft.

**HALE & NORCROSS.**—The north drift on the 2100 level is in 35 ft; ground tough and blasts poorly. The 2100 winze is showing some spots of ore.

**ORION.**—On the 2700 level joint Mexican drill hole No. 2 has been extended 200 ft.

**UTAH.**—The new gallow-frame at the top of the incline, mentioned in last week's report, was completed on Tuesday last, when the regular work in the mine was resumed. The incline has been sunk 10 ft; total depth below the 2150 level, 120 ft, on the slope.

**SILVER MOUNTAIN.**—The 2300 upraise was advanced 35 ft; total, 700 ft, making the connection. Ore raised during the week 201 tons.

**CALIFORNIA.**—During the past week 423 tons of ore, assaying \$21.30, have been extracted and sent to the mills.

**CON. VIRGINIA.**—During the past week 308 tons of ore, assaying \$33.43 per ton, have been extracted and sent to the mills.

##### CHERRY CREEK DISTRICT.

**STRIKES.**—White Pine News, Mar. 20: During the past week important strikes have been made in the principal mines in this district. The new developments are encouraging signs, and it is safe to predict that in another year the hulkion product of the district will be more than doubled.

**TEACUP.**—At the Teacup a promising strike has been made on the 300 level. This new discovery is opportune, and must greatly encourage the company just at this particular time.

**STAR.**—At the Star a surplus of ore has accumulated, requiring some of the miners to lay idle until better facilities are made for hauling and crushing.

**BOHEMIAN GIRL.**—Messrs. Barwick & Griswold have expended a great deal of labor on their property, and are now being rewarded by the development of a strata of ore of the richest grade, assaying from \$30 to \$400 per ton.

**EXCHANGIA.**—Still richer rock has been struck in the Exchange mine.

**DROPPING STAMPS.**—Thursday afternoon, about 5 o'clock, the new Teacup mill dropped stamps for the first time. Quite a number of visitors were present on the occasion. The mill has been in course of erection for about 3 months. All the machinery has been placed in position under the supervision of Mr. Courtney, who came out from New York for that purpose. Besides the mill several other necessary and useful buildings have been erected, notably among which is the assay and retorting offices.

##### ESMERALDA DISTRICT.

**ENCOURAGING.**—Esmeralda Herald, Mar. 26: The interest taken in the mines here during the past few months is surely very encouraging. Men of capital have been awakened to the fact before them for the past 3 years by the Herald, that a good mill is all that is lacking to make the output of hulkion prove to capitalists abroad the richness of our district, and realizing the sound sense embodied in that old saying, "the Lord helps those that help themselves," or words to that effect, are making a move in the direction of securing that much needed necessity to the welfare of the district, and it seems an almost settled fact that a good mill will be in course of erection here this summer. The mines that are being worked certainly look promising, and some of them show ledges of extremely rich ore.

**CENTENNIAL.**—The Centennial, on Silver hill, is a wonderful mine, and shows a large body of fabulously rich ore. The mine has been worked in an economical manner by the owners for the past few years, and has been made self-sustaining with the crushing of a few tons now and then of the first-grade ore. The intention of the owners is to put the mine in a condition to extract a large number of tons daily, so that when a mill is erected here this mine alone, if necessary, will be able to keep 10 stamps running steadily for an indefinite period on at least \$700 ore.

**THE ROTHEILD.**—"Yank" Gupta has gone to work on the Rotheild with the intention of opening it up in good shape.

**REAL DEL MONTE.**—The water is still rebellious, and a desperate war is being waged against it. Of course nothing can be done in the way of prospecting on the 800 level until the water is under control.

**PROSPECTING.**—The lower levels show a vast amount of low-grade ore that with a modern-improved mill would pay to work.

**HUMSOLTE WEST.**—The crosscut from the bottom of the shaft shows a better character of ore and of higher grade than that encountered in the shaft.

Quite a number of parties have been prospecting in the hills around town the last week, and now that the snow has almost entirely disappeared, others will soon start out.

#### ARIZONA.

**ARIVACA GRES.**—Arizona Citizen, Mar. 27: Mr. L. T. Farr, who came in from Arivaca on Tuesday, brought some beautiful specimens of ore from the Arkansas mine. The shaft has been sunk 125 ft, where the ledge is about 10 ft wide. The pay streak about 18 inches wide, had just been encountered, showing very fine black sulphurates, chlorides and an abundance of horn silver. The Albatross, owned by Messrs. Long & Wores, now shows a 9-ft ledge of solid ore, assaying an average of over \$100 per ton.

**SILVER BELL.**—Mr. Sol. Schwab, who got in from the Silver Bell district last Sunday, is enthusiastic over the prospects of that camp. The Old Boot mine, owned by the Huachuca M. Co., has a 100-ft tunnel into the ledge, showing a 35-ton lot of ore yielding from 45% to 50% copper. Over 1,500 tons of ore are now on the dump awaiting the erection of a smelter, which will be in place within 30 days. The scenery is described as delightful and the climate unsurpassed. Prospectors are flocking in rapidly, and the stage line has all the work it can attend to. The prospects of the camp are indeed flattering, and the boom has evidently reached there.

**RENO MOUNTAIN.**—Arizona Mining Journal, Mar. 23: At the Brown Bros' mine, in Reno mountain, they were making some important developments. Three open cuts had been made, and there were 700 or 800 tons of ore on the dump, which would average \$30 per ton. They propose to establish, in a short time, a 40-ton mill at Cave creek. He saw Mr. Shipman, who had charge of the improvements on the Vulture mine. He had just returned from Tonto basin and reported very favorable gold prospects in that region.

#### IDAHO.

**BANNER.**—Yankee Fork Herald, Mar. 22: Everything has a healthy appearance in this camp. The Crown Point never before looked as well as now. In the west drift there is 6 ft of first-class ore, the vein itself being 14 ft between walls. In the east drift there is a fine 3-ft ledge of good rock. The two chutes of ore that were 40 ft apart on the level above, are but 10 on the present level.

#### MONTANA.

**ALTA MONTANA.**—Helena Independent, Mar. 24: The Alta and Gregory mines are both well opened and properly worked. The immense quantity of ore in sight in the Alta puts the question of product for the company's reduction works beyond any question. With proper handling of its ores, the success of the company is no longer a matter of any uncertainty. On Monday next the smelter will start and the reverberatories before that time. The new mixture of the concentrates with the rich Alta ore will make the smelting charges run high.

**IRON.** ore has been discovered. Of its character little is yet known, except that its croppings carry 64% of iron and it is apparently 40 ft wide.

**THE PARSELL MINE.**—Of Poor Man's gulch, in Deer Lodge county, is developed now by a shaft 60 ft deep and a level run for a distance of 32 ft into the hill toward the west. At the foot of the vein narrowed to 2 ft, but at 50 ft it is 3 ft wide and apparently opening out considerably.

**THE EMPIRE.** of Marysville, has reached a depth of 32 ft in its shaft, and a crosscut from a good hanging wall has revealed 75 ft of "rattling good quartz," and no footwall yet is found.

**THE NEBLE GRANT.**—The contract to sink 60 ft on this level is now completed, and 24 ft of solid gale is found along the footwall. A crosscut is now 9 ft across the ledge from the footwall and no hanging wall is found yet.

#### NEW MEXICO.

**COPPER SMELTER.**—News and Press, Mar. 20: The copper smelter at the San Pedro district has just started, and the daily production is from 3 to 4 tons of copper mat.

**COL. BEROMANN.** Superintendent of the Cimarron mining company was down on Monday. He reports good progress in the erection of machinery, and that the company now has about 700 tons of ore on the dump.

**COL. GILLETTE.** passed down the railroad last week en route to the Black Range, where he is supposed to have a bonanza in the Wall Street No. 1.

**MR. S. L. WILEY.** went East last Monday on business connected with his pipe contracts in New Mexico. Mr. Wiley is putting in the pipe for the Canyon del Agua and San Pedro company, for the Aztec Placer company, and for the Moreno Valley placers.

It is expected that the pipe line for the Moreno Valley placers will be in by June, so as to secure this season's work. As soon as the snow will permit, Capt. Roger, Mr. Wiley's assistant, will visit the ditch at the head of the line to complete the estimates which he was preventing from finishing last fall.

**THE CLIFTON PLACERS.** on the San Francisco river, have lately passed into the hands of Eastern capitalists. These are said to be very extensive, and rich gravel deposits in places 300 or 400 ft thick, with abundant water, 3,000 inches, for hydraulic mining.

**MR. S. L. WILEY.** the successful and enterprising engineer, is putting in pipe, and expects to have 3 giant nozzles in operation this summer.

#### OREGON.

**PLACER.**—Oregon Sentinel, Mar. 19: Messrs. W. D. Anderson and Frank Cook have discovered rich diggings on Jackson creek, near Farmer's flat, in which they have taken out as high as \$15 per day with a rocker. T. L. Beck, of Willow Springs, has commenced cleaning up, but expects to have work until the 1st of June before completing it. Prospects look so good that he expects to pay friends in the East a visit next summer. Supt. Benner, of the Centennial, has been picking up considerable coarse gold, which indicates a good clean-up soon. Supt. Ennis reports full heads of water in the large hydraulic claims on Galice creek, and everything working admirably. The Sugar Pine ledge, owned by Green Bros., of Galice creek, is yielding rock enough to keep the arrastras running steadily. The quartz will average \$50 per ton, with plenty in sight. A. P. Ankeny & Co. this week returned with exceedingly rich ore, being picked up by capitalists for their Sterling ditch and mine, and the property is not for sale. It is estimated that it will take 30 years to work out the ground, patented to the owners. During the coming summer 2 more miles of ditch will be built.

**GOLD.**—Democratic Times, Mar. 19: D. W. Anderson and Cook Bros. have struck a rich streak in a gulch on Farmer's flat, near Jackson creek. From 5 buckets of dirt \$18.57 was realized, while one day's work with a rocker returned \$15 and another a like amount. The gold is of an excellent quality, but unfortunately the water is so light that no extensive mining can be done. The miners of Josephine county have plenty water still and are busily at work, sanguine of a good run. Water is becoming light in some places and more rain is needed there. Most of the miners will be able to run some time longer in any case. However, work at the Fort Lane diggings is progressing. Thos. Kabler, one of the proprietors, informs us that a piece worth \$10 and several smaller ones have been picked up there recently. Prospectors will find a full line of mining blanks, printed after the latest and best forms, on hand at the Times office. Also a supply of Copp's Hand-book of Mining Law, standard authority. W. H. Benner, of the Centennial mine, near Willow Springs, showed us some neat pieces of gold picked up there recently. He informs us that pipping is progressing advantageously and that a good clean-up is expected.

#### UTAH.

**BARBER MINE.**—Silver Reef Miner, Mar. 26: The Barber mine was closed down on the 21st inst., and we understand that work will not be resumed until the wages question is settled. The mill is still running, and will work up the ore on the dump before being shut down.

**SUPR. ALLEN.** has returned from his brief exile, and again assumed the management of the St. Louis company has suspended all work at the mine, in accordance with instructions received from the office in San Francisco.

No definite understanding has yet been arrived at in the matter of a compromise between the Miners' Union and the companies, although some steps looking toward that end are now in progress.

#### New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department No. 10, San Francisco:

**CENTRAL GAS CO.**—Mar. 24th. Object: Manufacturing and supplying heating and illuminating gas. Capital, \$1,000,000. Directors—Charles J. McLaughlin, Alexander Forbes, Charles Kohler, A. D. Sharon and Jacob Schweitzer.

**CALIFORNIA & NEVADA R. R. CO.**—Mar. 24th. Capital, \$2,500,000. Directors—John T. Davis, A. J. Rhodes, J. M. Reigart, S. M. Miller, B. B. Miner, James McKenley and C. H. Livingston. The proposed route of the new line is from a point near San Francisco through the foothills of the Sierra Nevada to the town of Modesto; thence easterly through Stanislaus county to a point at or near Sonoma and Columbia, in Tuolumne county; thence to a point at or near the Calaveras big trees, in Calaveras county; thence through Alpine county to a point at or near Bridgeport, in Mono county; thence to the State line at a point at or near Dexter Mills.

**CHOUINARD M. CO.**—Mar. 23rd. Location: Lewis district, Nevada. Capital, \$10,000,000. Directors—H. H. Pearson, W. E. Norwood, Thomas Holt, A. Bateman and A. C. Wightman.



## The Ferns of the Pacific Coast.

[Read before the Academy of Sciences by Mrs. S. A. P. LEMMON.]

The ferns of the Pacific coast, found growing nowhere else in the whole world, except as exported or cultivated, represent 20 species and four well-marked varieties. The number found on the Pacific coast, as well as elsewhere—i. e., the cosmopolites—are 42 species and 14 distinctly-marked varieties; adding these to the exclusively Pacific coast ferns, we have in all 62 species and 17 varieties.

In all North America, north of the Mexican boundary, there have been discovered, up to date, 151 species and 24 varieties. From this, it will be observed, the Pacific coast claims more than one-third of the entire number. With such a large proportion of this interesting and most beautiful division of the vegetable kingdom represented, it seems fitting, as we have attempted, to segregate from all directions, and put the material into compact and available form. This has been done with painstaking and no little research, compiling from the latest authorities; the newly-discovered ferns being described from personal observation, aided by the microscope, upon the living plants and the dried specimens of the herbarium.

Let us touch briefly, as the hour permits, upon the geographical range of ferns; their origin, life history, some peculiarities, their brief American literature, and, lastly, in a general way, tell something about the latest discovered ferns, together with the new ferns in general.

### Geographical Range.

Ferns generally love heat, shade, moisture and stillness; hence, are most abundant in the islands of the tropics, but they are distributed over all quarters of the globe, always in much smaller ratio than the flowering plants.

The whole number of species known and described up to date is about 3,000. Four hundred and sixty species are found in the single island of Java; the small island of Ceylon has 214 species; the West Indies, in round numbers, has 400. On the mainland, Brazil has 387; the Isthmus of Panama nearly 120; while tropical America reaches the large number of nearly 1,000. Contrast with these regions North America, north of Mexico, with its 151 species; all Europe, 67; and the Arctic zone, only 26 species.

The ratio of ferns to flowering plants may be readily seen by citing two or three examples:

Tropical America has 1 fern to 35 flowering plants.  
New Guinea has 1 fern to 4 flowering plants.  
United States (east of Mississippi) has 1 fern to 46 flowering plants.

### Floral Divisions.

North America presents four natural floral divisions—the Atlantic slope, the Valley of the Mississippi, the Rocky mountain region and the Pacific slope. When we speak of the Pacific coast, in this paper, let it be understood that we mean a naturally distinct division, bounded on the south by Mexico, on the east by a line through the mid-valley regions, lying between the Rocky mountains and the Sierra Nevada range, extending northwestward to Alaska. This general division will be found to include the southwest corner of New Mexico, all of Arizona, the southwest portion of Utah, all of Nevada, California, Oregon, Washington Territory, British Columbia and southern Alaska. This gives a wide range of temperature; from the hot tropical and forcing, through the milder temperate, to the dwarfing cold of the Arctic regions. All these conditions are, also, produced, of course, by difference of altitude, from the humid coast to the ever-snow-clad peaks of the region.

Special climatic conditions are the result of peculiar trends of coast and mountains, producing special flora. For example, the large number of plants, including the great sequoias and Santa Lucia, or Bracted fir, found only in limited localities of this region.

Ferns are always associated with ideas of shade, coolness, shelter and protection, mostly nestling around rocks or clinging to trees, filling up the shady interstices. There is, however, one exception to this law, which is very notable. A so-called variety of *Pellaea Wrightiana* is found on Mount San Bernardino, growing out in open sunny slopes, like a *Delphinium*, or larkspur, the *Salvia*, etc., and for this reason, combined with other, based upon contracted fronds, achen hue, extreme rigidity, etc., we believe it to be distinct.

### Peculiarities of Distribution.

Sometimes identical species appear in the most widely-separated regions. An illustration may be given of one of our own ferns, *Aspidium mohrioides*, known as the "Falkland Islands Shield fern," first discovered on the Falkland islands, in 1824, by the botanist of Duperrey's voyage, later at Patagonia and in the mountains of Chile; all the while limited to the southern part of South America and its adjacent islands. Now, away up in northern California, near Mount Shasta, 6,000 miles from its nearest known habitat, Mr. Lemmon discovered, in 1879, this beautiful fern, which was at first supposed by Prof. Eaton to be a distinct species. It excited such attention that a council of dis-

tinguished pteridologists assembled, and, after due examination, felt obliged to consider it identical with this Falkland island fern; but, as it is a magnificent fern, new to North America, and found near the matchless Shasta, we give it the popular name, in the catalogues, of "New Shasta fern."

All but one species of ferns are terrestrial. This one (*Ceratopteris thalictroides*) is aquatic, and is found in the everglades of Florida; the sterile frond floating on the water.

All but a few species are perennial, and nearly all of these, particularly the tree-ferns, are evergreen.

### The Origin of Ferns.

The first information we gather about the origin of ferns is recorded in a portion of the big book of nature—the everlasting rocks. Not inscribed in hieroglyphics or shadowed hints of fern existence, but harring the whole plant, or parts of it, entombed in their embrace.

In the Devonian age, or age of fishes, ferns first appear, rapidly increasing, both in number and size, up to the Carboniferous age, when we find them so abundant as to constitute often the bulk of certain coal strata, and to have been tree-like in form, 50 to 70 ft. in height, with trunks a foot to three ft. in diameter. They attain their best development, also, in the Carboniferous period, and from the fossilized specimens of parts of the trunks of the magnificent tree-ferns, their cellular structure is shown in a wonderfully beautiful manner. After this period it seems that the luxuriance of vegetation diminished, as if the earth, in its over-feeding of these beautiful cryptogams had become exhausted, so that one form after another disappeared, and the size of the remaining ones was greatly diminished, until we find them, as at the present age, with no apparent change since pre-historic days.

### The Life of a Fern.

The life of a fern begins from a spore, which is analogous to the seed of a flowering plant, and tends to the same result—the propagation of its kind. In structure, a seed and a spore are quite different; a seed having a definite rudimentary plant, while a spore contains nothing inside its cell-wall but a particle of protoplasm, or albuminous substances, with no vestige of a plant, no matter how highly magnified; hence, we are prepared to find that the growth of a fern must be entirely different at the outset from that of the flowering plant.

### Fern Sporangia.

These spores are always in little cases called *sporangia*, located on the back or underside of the frond. They are developed, in all instances, from the outer cells of the frond, upon which they are borne. The leaf tissue is often sacrificed to such an extent that the frond becomes greatly contracted, or the leafy portion entirely disappears and gives place to a mass of spore-cases, held together by the veins and skeleton of the frond, as in *Cryptogramme acrostichoides*.

When the numberless minute spores are ripe, the annulus, or ring, that surrounds the sporangium—being made of firmer material than the netted or reticulated case—springs open, rending the tender netted case at the sides, and the freed spores fly off into the air like dust, depositing themselves in the earth, in crevices of rocks and on tree trunks, or wherever the conditions are favorable for growth—that is, sufficient warmth, moisture and stillness. After a few days a greenish scum or film covers the damp surface. This is the first stage of fern life.

### Cell Wall of the Spore.

The outer cell wall of the spore is composed of a peculiar substance called cellulose; composed of  $C_6H_{10}O_5$ . This cell is broken by the warmth and moisture; the protoplasm, or cell contents, comes out and divides, forming minute new cells, which join themselves to the first cell, and continue the process until little shield-shaped structures appear, or are built up, standing at an angle of about 45°, growing thick together, resembling small scales, imbricating or overlapping, like the scales on a butterfly's wing, or, if magnified, would resemble the slate upon a roof. These minute scales (*prothallia*) are attached to the earth, a damp well, rock crevices or any favorable substance, by root-hairs, not true roots.

This first bed or prothallus, or pro-emhryo, is composed of cells filled with a green substance called chlorophyll, which gives it the usual bright, living, green color. On the under side of this *prothallus* are organs analogous to the stamens and pistils of flowering plants, and are called, respectively *antheridia*, containing the male element, equivalent to the pollen of flowers, and the *archegonia*, equivalent to the pistil and ovaries of the flowering plant. The *archegonia* are near the *sinus*, or upper notched edge of the *prothallus*, located just above the *antheridia*.

When these two different cells open, the ciliated *antherozoids*, being endowed with elasticity and motile power, uncoil, swarm out and some of them fall into the open cell of the tubelike *archegonia*, and at its base is located the mother-cell, called *oosphere*, or egg-cell, which it comes in contact with, when the *archegonia* immediately closes. Its hidden process of development goes on, and at length it is found that the central cell divides into four cells, the two lowest sub-dividing; then become imbedded in the substance of the prothallium. The two upper of the four cells sub-divide also, one developing into the plumule or first stem, the other into a radicle or first rootlet of the young fern. And so it springs into life—a fine example of what is termed alternation of generation.

### Another Method of Fern Growth.

Ferns are also reproduced by means of *gemmae*, or what is called *viviparous buds*, which grow on the stalk or surface of fronds; sometimes on the upper surface as in *Asplenium bulbiferum*, sometimes on the under surface as in *Cystopteris bulbifera*. In the *Cystopteris* they fall off and grow during the second season, but in most others remain and develop several fronds, still drawing sustenance from the parent plant.

This curious method of growth is traced through all plant life, from the lowest *Algae* to the highest *phanerogams*; especially does the tiger lily furnish striking examples in its detached axillary buds at the base of each leaf.

### Some Peculiarities of the Frond.

The frond or leaf of the fern seems capable in some instances of indefinite development in extension, or wonderful stretching out growth in the length of frond. Some show a dichotomous tendency of growth, i. e., forking at the tips of the frond. Sometimes the fronds develop a yellow or white farinaceous powdery substance, usually upon under side often in such abundance as to hide the delicate fruit and give name to the fern—as the gold back Cal. fern (*Gymnogramme triangularis*) or silvery plumefern (*Notholena Lemmonii*).

### Fern Literature of America.

Not till after our country had dated its century did any systematic work upon ferns, scientific or popular, appear from our American press. Much has been done abroad in reference to our ferns, by Sir W. J. Hooker; and later his son, Sir Joseph D. Hooker, with several others, has continued the work in bringing out general reports and descriptions of ferns and the rest of *Vascular cryptogams*. Since that time, in the year 1878, Prof. J. Robinson has issued a neat little work, "Ferns in Their Homes and Ours," full of interest and a valuable help to those who wish to cultivate these most graceful plants. Then followed an octavo volume on the "Ferns of Kentucky," illustrated with etchings from nature, by Mr. Williamson. Following close upon these came a check list of ferns, on a single sheet by Mr. Wm. Edwards of Natick, Mass., intended as a convenient medium of exchange.

In 1879 Mr. George E. Davenport published under the auspices of the Massachusetts Horticultural Society of Boston, a valuable and most instructive catalogue, or it might be called commentary, of some 40 pages, relating to the Davenport herbarium of North American ferns. In 1880 "A Systematic Fern-list of the Known Ferns of the United States of America, with the Geographical Range of the Species, and the Recognized Authorities for Nomenclature," was issued by Prof. D. C. Eaton, as an accompaniment to his large, exhaustive and finely illustrated work on "Ferns of North America." This comes to us in two large volumes of over 600 pages—not mere picture books of ferns, but they stand in the first rank, as a work of close, scientific research, a very present help to a close study of the ferns of our Pacific coast. The results of these studies it becomes a real pleasure to report.

### New Ferns of the Pacific Coast.

The new ferns, or those but lately discovered and described, are ten in number:

*Notholena Newberryi*, Eaton.  
*Notholena Grayi*, Davenport.  
*Notholena Lemmonii*, Eaton.  
*Notholena nivea*, Desveraux.  
*Cheilanthes Wrightii*, Hooker.  
*Cheilanthes viscidula*, Davenport.  
*Cheilanthes Cooperi*, Eaton.  
*Cheilanthes Clevelandii*, Eaton.  
*Aspidium Nevadaense*, Eaton.  
*Aspidium mohrioides*, Bory.

Three of these, *Notholena Grayii*, *Notholena Lemmonii* and *Notholena nivea*, were only detected last season, in Arizona, and hence are not described and illustrated in Eaton's "Ferns of North America." These, with the peculiar and hardly less interesting *Aspidium mohrioides*, will be described in a general way in conclusion with the uses of ferns.

The *Notholena Grayi*, *Lemmonii* and *nivea* are all small, delicate and fragile, white-powdered beneath, growing in nearly the same locality—Mt. Santa Catarina and Mt. Graham, southeast Arizona. The two first are plume-like, the latter pyramidal in outline.

The *Notholena Grayi*, Davenport, is a beautiful little fern, growing from four to six inches in height, is broad-lance shaped in outline, but simulating a plume-tip. The stalks are few in number, and rise from a knobby or nodose root-stalk, growing in clumps on the grassy slopes of the foothills, under the shade of rocks. It was found many years ago by Mr. Schott, in Sonora, Mexico, but owing to the meager, fragmentary specimens, it being fragile and difficult to preserve, it was supposed to be portions of some other fern, and so was passed by, till again collected within the boundary of North America, by Wm. M. Courtis, in February or March, 1880, in southeast Arizona, the exact locality not reported, and by Mr. Lemmon in April of the same year, in Sanicita valley, Patagonia mountains of southern Arizona. Larger and finer plants were collected in August on the foothills of Mt. Graham, near Camp Grant, southeast Arizona. Mr. Davenport describes it as a lovely fern and quite different from any known species, and so cannot be compared. Under the microscope the white powder separates into distinctly stalked, gland-like bodies, with enlarged, conical, flat or inverted heads, like a miniature host of fungi, with their variously shaped cups. The little brown scales that, with the powder, give it such rich color, under a power of 200 diameters, become like

long, tapering tubes, which contain the brown coloring matter, which, collected at the base or at intervals throughout the scale, gives it the appearance of being jointed. It is a beautiful object for the microscope. Mr. Davenport concludes: "This species is one of the most elegant yet discovered, and I take pleasure in dedicating it to one pre-eminent in American botanical science—Dr. Asa Gray."

### Notholena Lemmonii, Eaton.

(Lemmon's silvery-plume *Notholena*): During the same exploring expedition Mr. Lemmon fortunately detected a beautiful, silvery, plume-like *Notholena*, appearing unlike any he had ever before seen. With eagerness he secured all the specimens possible, together with a few live roots from among the clefts of granite rocks. Its known habitat is in two ravines on the southern side of the Santa Catarina mountains, at an elevation of about 6,000 ft., and about eight miles from Fort Lowell. These fragile but carefully prepared specimens were sent on to Prof. Eaton, and be at once replied: "Your No. 15 appears to be a new *Notholena*." In the next issue of the Bulletin of the Torrey Botanical Club, June, 1880, be publishes a description of the fern under the above name. The close botanical description is also in its classified place with our Pacific coast ferns.

### Notholena nivea, Gillies.

(The snowy *Notholena*.) In the following month, the same party, while at Tombstone mining along the granite comb above, regardless of the millions of rich quartz beneath his feet, discovered on this granitic eminence, at about 6,000 ft. elevation, a delicate, snowy *Notholena*, which, upon close inspection, proved to be the *Notholena nivea*, its appearance true to its name. It was first discovered in Mexico, and as far south as Peru, but this is its first recognized welcome to our own land.

It is a very pretty and interesting fern, with prim, black, wiry and polished stalks supporting its pyramidal fronds, that thus stand rather proudly, beckoning, as it were, to the prospector, and hinting, by its silvered pinnules, flecked with golden fruit, that untold treasures of silver and gold are bidden in the silence of the rocky bed beneath. This species is also technically described in its proper order of analysis of the ferns of the Pacific coast.

### Aspidium Mohrioides, Bory.

(The new Shastashield fern.) We come finally to speak of the most interesting discovery in ferns that has occurred for many years—the magnificent evergreen, full-fruited *Aspidium*, before spoken of as being found only at two widely removed stations on the globe, the southern part of South America and here, 6,000 miles distant in northern California, near Mt. Shasta.

This fern slightly resembles full-fronded specimens of *Aspidium aculeatum* variety *scopulinum*, but is of a brighter, richer green, with pinnatifid or many-winged pinna; its fruit abundant, and so crowded upon the back of the frond that the very large covering over the spor cases or fruit are lapped or imprinted, like saucers on a sideboard; an appearance that is preserved in many of the herbarium specimens to a remarkable degree.

On the 8th of July, in '78, Mr. Lemmon discovered this fern near the headwaters of the Sacramento river, on the south side of Mt. Eddy, 20 miles west of Mt. Shasta. It grows around granite boulders, in moist places, accompanied by the varieties of *Aspidium aculeatum*, the *Scopulinum* or "little brush fern." This association and close resemblance of the two ferns has no doubt caused the escape from detection heretofore.

This circumstance of location also opens the door to a wide field of inquiry, as to why these closely resembling yet structurally different forms should be found in juxtaposition. Which is the pioneer possessor of the soil? Which is the usurper, simulating the livery of the rightful heir and encroaching upon his domains? Or is there some subtle power in the elements of earth and air generated or tempered by the proximity of the lofty Shasta, that modifies and blends these gentle, passive ferns into almost like forms.

### Little Known Ferns.

There are several little known ferns, found at long intervals of time by some especially sharp-eyed explorer—perhaps seen only once along the Mexican boundary. In some instances the specimens are meager, being but a single frond, or only a few segments of a frond. Of these, Prof. Eaton entertains the hope that some one will be so fortunate as to find some of the ten at least, or, as he adds, re-discover the *Notholena tenera*, the tender little cloakless wanderer; *Cheilanthes microphylla*, the small leafy fern; *Cheilanthes leucopoda*, the white-stalked fern; *Pellaea pulchella*, the most beautiful little cliff-brake; *Pellaea aspera*, the rough cliff-brake; *Adiantum tricholepis*, the silky-leaf maiden-hair; *Adiantum tenerum*, the tender-leaf maiden-hair; and *Asplenium septentrionale*, the northern spleenwort—all the above named being reported from the southern boundary. In the other direction, among the islands of Alaska, the *Cheilanthes argentea*, of Hooker, the silvery fern, is supposed to be found, as it is abundant on the northern coast of Asia.

This subject about canvasses the subject of our Pacific coast ferns, and we will close by brief reference to the

### Uses, Benefits, etc., of Ferns

In general. Thus far ferns have contributed more to aesthetic taste, ever and always a delight to the eye, than to serve for extensive practical use. Some species are justly reputed, however, to have fine medicinal qualities. To



illustrate: within a few months past it has been discovered and strongly confirmed that the *Aspidium ripidum*, *var argutum*, found in the Oakland hills, is a powerfully effective yet harmless antihelmintic. In some parts of the world the young root-buds and tender fronds of certain ferns are cooked for food.

Referring again to the use of ferns as contributing to aesthetic taste, let us direct attention to the entertainment and exquisite pleasure to be derived from a close study of ferns, either in their native haunts, or by carefully preserved specimens in herbariums. Bearing upon this subject I cannot do better than to quote the words of John Robinson, who has some fine practical thoughts in his helpful book, "Ferns in Their Homes and Ours": "There is a large class of persons," he writes, "who are so fortunate (or unfortunate, according as they use or abuse the privilege) as to have nothing to do, or to speak more exactly, have to do only what they choose. This class must have a hobby or they will rust out. Another class are engrossed by hard professional work which leaves them every day tired and, perhaps, cross. These should have some outside hobby, or they will become one-sided and crabbed, and these will wear out." Botanical literature abounds with instances where eminent authors have been derived from these two classes of persons. Mr. Robinson continues: "Without an object we walk aimlessly, we read aimlessly and we work aimlessly. Without a hobby no great man would be great. Every person, old or young, outside of an insane asylum, should have some one thing in which an intellectual interest is taken. Forced to study what we detest, as often happens at school, we not only lose the time spent, but a listless habit is engendered; but if taken at the point on which our interest can be excited and led by skillful hands and clear heads, those whose lives would otherwise become dull and trivial, can be indirectly guided to much higher aims and attainments. The 'fern mania,' as it is called, which may be traced from Europe across the Atlantic, to its recent development in America, is a hobby vastly superior to most others.

The fern hobby, properly guided, can be the means of stimulating pure and healthy exercise, or pleasant and entertaining study; but whether pursued as a pastime or a study, in any event, it can do no harm, and may be the cause of great and permanent good.

In Syracuse, N. Y., there is a fern club, composed mostly of ladies, presided over by Mrs. Rust. This club has made extensive collections by discoveries and exchange. The members pursue the study with such zest, pleasure and success, that the knowledge of their club is spread world-wide, and its example is being extensively emulated.

## THE ENGINEER.

RAILWAY construction is rapidly progressing in Mexico, as will be seen from the following facts which we condense from *The Two Republics*: The Mexican National Construction Co. (Palmer & Sullivan) is laying track on its road from the city of Mexico to Toluca, and also on the division from Zacatecas towards San Louis Potosi. These two divisions give employment to about 15,000 men. The Mexican Central (Atchison, Topeka & Santa Fe) is pushing its road northward as rapidly as abundant means and a large force of men will carry it. About 11,000 men are employed on the line between the capital and Pula, and between the latter place and San Antonio there is a large additional force. Several iron bridges and stone culverts have been built. Sixty odd miles of road are graded, and care are running 53 miles from the capital. The Morelos railway, owned by a local company, is completed to Ozmumba. Sixty-two miles of road are in running order, and iron is being laid on 10 miles more. So far 152 iron and stone bridges have been built on this road over streams and canyons. The road is owned and managed entirely by Mexicans. All the roads now being constructed in Mexico are increasing their working force for the purpose of completing as much work as possible before the rainy season commences. The managers of the Sonora railway are getting laborers from the mining camps of Arizona. Twenty-two miles of the Hidalgo railway are in running condition.

PROJECTS.—A company has been organized for the construction of a narrow-gauge road from Galveston and Houston, Texas, to Corpus Christi, where it will connect with the Corpus Christi, San Diego & Rio Grande road, lately acquired by the Palmer & Sullivan syndicate and now being extended to the Rio Grande. This is another step in the movement for a continuous narrow-gauge system from the northern lakes to Mexico. A corporation has been formed in Boston to construct and operate a road in the Argentine Republic 130 miles in length.

THE NORTHERN PACIFIC.—We learn from an official source that the Northern Pacific railway will be lengthened 400 miles the present year. This will leave a gap of 450 miles between the western terminus of the eastern section and the eastern terminus of the Columbia river section, and a second gap of 150 miles between the Columbia river and Puget sound. The entire length of the road when completed will be 2,700 miles.

RAILROAD BUILDING IN THE UNITED STATES. With one single exception, there were more miles of railroad built last year than heretofore in the history of the Union. Fifty years ago (1830) there were but 23 miles of railroad in the United States. Ten years later (1840) the lines had extended to 2,818 miles. At the end of the next decade (1850) there were 9,021 miles; and, according to the reports for 1860, the railroads of the country had reached 30,635 miles. And within the next 10 years, which embraces the period of the civil war, the mileage was nearly doubled. Ere the mutterings of the war had died away the recuperative power, enterprise and genius of the American people were revealed as never before, in establishing and extending the lines of travel and commerce, so that in 1871, the mileage of new road completed amounted to the enormous amount of 7,670 miles. During last year 5,206 miles of track were laid down.

HUDSON RIVER TUNNEL.—According to the *Railway News* the Hudson River tunnel is advancing satisfactorily toward the New York shore at the rate of five ft. a day. Two hundred men are employed digging out the dirt and putting in the iron and brick work. The tunnel is finished as they go along, and the work is much safer than under the old plan, which resulted so disastrously. A small tunnel, about six ft. in diameter, is run ahead of the larger tunnel, which follows and incloses it; warning is thus given of the nature of the soil. The work is now in the south tunnel, which is now completed 290 ft. from the shaft, and will soon be out as far as the north tunnel, which has been cleaned out, but not extended, since the accident. Both tunnels will then be carried along together. A caisson is in course of construction for beginning the work on the New York side.

STEAM ENGINE RUNNING.—In a recent number of the *Engineer* (London) it was asserted that "no steam engine has yet been made which will run continuously and quite steadily for long periods of time at 600 revolutions per minute." In reply, a correspondent writes to the same paper that an engine invented by a Mr. Brotherhood, of London, and which has been in use for some time for working Mr. Brush's and other kinds of dynamo-electric machines, is found to work at a higher speed even than 600 revolutions very satisfactorily.

## USEFUL INFORMATION.

### Industrial Secrets.

A century ago, what a man discovered in the arts he concealed. Workmen were put upon an oath never to reveal the process used by their employers. Doors were kept closed, artisans going out were searched, visitors were rigorously excluded from admission, and false operations blinded the workmen themselves. The mysteries of every craft were hedged in by thickets of empirical pretensions and judicial affirmation. The royal manufactories of porcelain, for example, were carried on in Europe with an esprit of jealous exclusiveness. His Majesty of Saxony was especially circumspect. Not content with the oath of secrecy imposed upon his workpeople, he would not abate his kingly suspicion in favor of a brother monarch. Neither king or king's delegate might enter the tabooed walls of Meissen. What is erroneously called the Dresden porcelain—that exquisite pottery of which the world has never seen its like—was produced for 200 years by a process so secret that neither the bribery of princes nor the garrulity of the operatives revealed it.

Other discoveries have been less successfully guarded, fortunately for the world. The manufacture of tinware in England originated in a stolen secret. Few readers need be informed that tinware is simply thin iron plated with tin by being dipped into the molten metal. In theory, it is an easy matter to clean the surface of iron, dip it into a bath of boiling tin, remove it enveloped with a silvery metal to a place of cooling. In practice, however, the process is one of the most difficult in the arts. It was discovered in Holland, and guarded from publicity with the utmost vigilance for more than half a century. England tried in vain to discover the secret, until James Sberman, a Cornish miner, insinuated himself master of the secret, and brought it home. The secret of manufacturing cast steel was also stealthily obtained, and is now within the reach of all artisans.

THE POPULATION CENTER OF THE UNITED STATES.—Ten years ago the center of the population of the United States was about 48 miles east of Cincinnati, Ohio. The Superintendent of the late census announces that the growth of the great West during the past decade carried the center of population about 50 miles west, while the large increase in the Southern States carried it a little southward. The result places the center of population within the limits of Cincinnati.

TO GET RID OF RATS.—Get your trap in your mill and catch one alive. Paint him a bright red color and let him go. Then put your trap in another place in the mill and catch another and likewise paint him and let him go. Your rats will soon disappear from the premises. Try it.

JUTE FOR BRUSSELS CARPETING.—A patent has been taken out in France by M. L'Heureux, which rests upon the jute in the manufacture of so-called Wilton or Brussels carpeting, which hitherto has been made from wool. The application of jute for this purpose is facilitated by the preparation of a portion of jute yarn into what is called the "Camel," and by the varying proportions of the number of the yarn made use of for the web and the main warp. The jute yarn is fermented for about 10 or 12 hours in a solution formed of 50 quarts of water and one lb. of alum, these proportions to be used for working about 90 lb. weight of thread. After the jute has thus been cleared of the oil it may have gathered during its progress through the various processes of the spinning mill, that is to say, after it has been disinfected, it is dyed if required in the ordinary way; the jute is then sized with the following preparation, one lb. of starch dissolved in 90 quarts of water; the same weight of jute is submitted to the weight of sizing above-named. The warp is prepared and dried in the customary manner. The weaving is carried out on looms, such as are used in weaving velvet, and therefore it does not require special observations. Carpets made in this way can be produced at a reasonable price. —*Fils et Tissus*.

PHOSPHOR TIN.—An alloy of tin with phosphorus has been in use in Germany for some time for making phosphorus bronzes. A practical man gives it as the result of his experience that such a compound must contain at least 9% of phosphorus, else part of the tin will remain uncombined. If more than 9% of phosphorus is introduced, the excess will be oxidized and volatilized, because the tin is unable to take up and hold more than a certain quantity of phosphorus. A compound containing 9% of phosphorus corresponds to the formula  $P_2Sn^5$ , corresponding to the higher oxide  $P_2O_5$ .

MEAT THIRTY YEARS OLD.—The *Analyst* for December contains a statement that a can of preserved meat over 30 years old has been examined, consisting of veal with considerable fat, and a few peas, which were found to be in a good state of preservation. An analysis showed only 0.68% of ash, which was entirely free from lead, and contained only minute traces of tin.

TO REMOVE THE BLUE COLOR IMPARTED TO IRON AND STEEL BY EXPOSURE TO HEAT.—Rub lightly with a sponge or rag dipped in diluted sulphuric, nitric or hydrochloric acid. When the discoloration is removed, carefully wash the article, dry it by rubbing, warm it and give a coat of oil or it will rapidly rust.

## GOOD HEALTH.

### Hot and Cold Baths.

The London *Lancet* in a recent number points out the difference between the effects of hot and cold baths. The effects of the cold bath, it says, being mainly due to impressions made upon the cutaneous nerves, the modifications of the cold bath largely depend on their power of increasing its stimulating action. The colder the water the more violent the impression. The frequent change of water, such as is found in the sea or in running streams, increases the stimulating effect. Great force of impact, as when water falls from a height or comes forcibly through a hose upon the body; the division of the stream, as is seen in shower baths and needle baths, and the addition of acids or salt to the water, all act, it would seem, by increasing the stimulating power which the water exerts upon the cutaneous nerves.

Warm baths produce an effect upon the skin, directly contrary to that brought about by cold water. The cutaneous vessels dilate immediately under the influence of the heat; and although this dilation is followed by a contraction of the vessels, this contraction is seldom excessive, and the ultimate result of a warm bath is to increase the cutaneous circulation. The pulse and respiration are both quickened, as in the cold bath. The warm bath increases the temperature of the body, and by lessening the necessity for the internal production of heat, decreases the call made upon certain vital processes, and enables life to be sustained with a less expenditure of force. While a cold bath causes a certain stiffness of the muscles, if continued for too long a time, a warm bath relieves stiffness and fatigue. The ultimate results of hot and cold baths, if their temperature be moderate, are about the same, the difference being to use the words of Braun, that "cold refreshes by stimulating the functions, heat by physically facilitating them; and in this lies the important practical difference between the cold water and the hot water systems."

HYDROPHOBIA VIRUS.—That obscure poison which produces hydrophobia has been known to lie latent in the human system for years before developing its fatal results. M. Pasteur asserts that the supposition is well supported that the virus does develop in certain organs, and not, as in other cases, in the blood; and that when, after a period variable according to circumstances, the organized poison passes into the blood severe symptoms come on rapidly, and the victim soon dies. An explanation substantially the same as this had long been advanced as a mere theory, but now M. Pasteur advances it as an ascertained physiological fact.

SUNDAY DINNER.—Sunday, by a large majority of mankind, is made a day of feasting, and the Sunday dinner is the principal one of the whole week. If there is any scrimping it is done through the week and the strength of the purse and efforts of the housewife are both concentrated and brought to a focus upon a Sunday dinner. Sunday is said to be a day of rest; but very little rest does the stomach find when it is loaded with an assorted cargo of highly seasoned viands, which gives it a job of overwork. And this is more onerous and provoking, as its owner lounges around and takes little or no exercise, which leaves the other organs without employment, and the poor stomach has to work on all alone, although it often exercises its constitutional right of grumbling at its owner's indiscretion and gluttony, which hath such extent that by the close of the day he feels much like a stuffed anasconda. If the quantity of food we eat is to be regulated by the exercise of the body, then the Sunday meal should be the lightest of the week, as usually but little physical exercise is taken on that day, whereas the contrary is the fact and the appetite is nursed and whetted throughout the week that it may make an onslaught on the fat of the land on Sunday, which is a manifest impropriety and a gross violation of the laws of health.

CHLORAL FOR TOOTHACHE AND FACEACHE.—Dr. Sporer in a St. Petersburg medical journal, after referring to the great benefit he had derived from chloral, whether administered internally or as an embrocation dissolved in almond oil, for the relief of rheumatism and other pain, states that in toothache and its accompanying facial pain a most effective remedy is found in dissolving from a scruple to half a drachm in two drachms of glycerine, and applying a plug of wadding soaked in this to the carious tooth. As, however, this causes in some cases considerable irritation of the mucous membrane of the mouth, he has during the last four years always applied the chloral in substance. From a half to at most one grain of the granules of chloral are wrapped in a little wool to keep them together, and placed in the cavity of the tooth. When the chloral has dissolved the accumulated saliva is to be spit out. If the tooth is in the upper jaw the chloral should be kept on by the finger until dissolved. The most violent toothache is in a few minutes relieved. He cites some cases in which most distressing and long-aiding toothache, accompanied by severe prosoptalgia, was thus promptly cured.

EFFECTS OF TEA ON THE SKIN.—If you place a few drops of strong tea upon a piece of iron, a knife blade for instance, the tannate of iron is formed which is black. If you mix tea with iron filings, or pulverized iron, you can make a fair article of ink. If you mix it with fresh human blood, it forms with the iron of the blood, the tannate of iron. Take human skin and let it soak for a time in strong tea; and it will become leather. Now, when we remember that the liquids which enter the stomach are rapidly absorbed by the venous absorbents of the stomach, and enter into the system by the skin, lungs and kidneys, it is probable that a drink so common as tea, and so abundantly used, will have some effect. Can it be possible that tannin, introduced with so much liquid-producing respiration, will have no effect upon the skin? Look at the tea-drinkers of Russia, the Chinese, and the old women of America, who have so long continued the habit of drinking strong tea. Are they not dark-colored and leather-skinned?

LONGSIGHTEDNESS.—The explanation of longsightedness (or farsightedness), which commonly occurs in old people, is a very simple one. The eye becomes flattened by a diminution of its fluids, or some structural change takes place in the crystalline lens by which its convergent power is diminished. The images of objects near the eye, therefore, are indistinct, because the rays of light proceeding from them are slightly divergent, and the converging power of the crystalline lens is inadequate to focus them upon the retina, but tend to focus the rays behind it. This defect is remedied by the use of convex glasses, which make up for the weakened convergent power of the eyes. With such aids, the rays from objects near at hand are rendered parallel or slightly convergent before entering the eye, thus enabling a distinct image to be formed upon the retina.

TOOTH TRANSPLANTING.—It often happens that a front tooth is broken off even with the gum, while the rest of the teeth remain good. This root may be removed and its place supplied with a sound, healthy tooth, previously removed for that purpose, and made to grow and perform all the functions of a natural tooth. A number of operations of this kind have been successfully performed by Dr. C. B. Stoddard, of Austin, Texas. As a rule, the teeth are selected from the mouths of healthy negroes, and the price paid from \$3 to \$10. Some of the most fastidious ladies in the State have had this operation performed, and are justly proud of the fact.

EGGS VS. MEAT.—According to Dr. Edward Smith, an egg contains 15 1/2% of carbon and 2% of nitrogen. Another writer estimates that the value of 1 lb. of eggs, as food for sustaining the active forces of the body, is to the value of 1 lb. of lean beef as 1,534 to 900. As a flesh producer, 1 lb. of eggs is about equal to 1 lb. of beef.



# MINING AND SCIENTIFIC PRESS

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## The Week.

In our comprehensive and condensed "Mining Summary" on another page will be found all the current mining news of the week. A perusal of this Summary will show pretty well what work is going on, and how very active the whole mining interest is.

The decision, given elsewhere, on what is known as the Burke-Bonanza suit, is well worthy of careful perusal by all stockholders in mining companies, as the principles there laid down are very important.

It will be seen from looking over our columns that a good many mining sales are now being consummated. The one to Scotch capitalists, of a mine in Sierra Co. is mentioned elsewhere. These sales prove that capitalists who know what they are about still think there is plenty of room for investment in California mines, without going to newer and more unsettled countries, where labor and supplies cost more than they do here.

Although the prospects for the interior of California for this year are good, in the city business is a little dull, but our home resources are sufficient to bring California out all right in the end.

HIGH EXPLOSIVES.—We shall begin in our next issue a series of articles on high explosives, which will be of great interest to all powder manufacturers and consumers. The first of the series will be on "Gun Cotton."

THE Starr-Grove Mining Co. of Nevada has declared a dividend of 10 cents per share, aggregating \$20,000, payable in New York on the 31st.

## The State Mining Bureau.

It will be recollected that when the Governor of this State sent his message to the Legislature he called special attention to the report of the State Mineralogist, and to the importance of the State Mining Bureau. He said: "The Act organizing the State Mining Bureau was one of the wisest measures passed at the last session. It is destined, if properly and judiciously fostered, to bring into active light many of the hidden resources of the State, and to impart, through the practical knowledge of its officers, the benefits which such discoveries yield."

"The State should appropriate a sufficient sum to defray the salaries and running expenses of this Bureau, leaving the amount collected 'as taxes on the issue of certificates of stock corporations,' for the sole purpose of purchasing specimens, preparing, arranging and analyzing them, and such other expenditure as may be rendered necessary for the practical benefit of the citizen."

"I have been informed that many very valuable and in some instances, exceedingly rare donations would be made to the Bureau were the same located in a building capable of showing them to advantage, and safe as a repository. To do this it will be necessary to change the present location, and as the value of the gifts would be greater than the outlay for rent, I deem it advisable such change should be made, and, in connection therewith, I would recommend that the mineral cabinet now hid away in our State Library be transferred to the care of the bureau, whose proper functions it is to care for it."

During the last session, in accordance with the above suggestion by the Governor. Mr. Wasson introduced a bill appropriating \$10,000 a year for two years to outfit the State museum. Through lack of time the bill was not passed.

The general appropriation bill which is to be passed at the extra session is to contain only "items required to pay the salaries of State officers, the expenses of the Government and of the institutions under the exclusive control and management of the State."

It is therefore possible to appropriate the \$10,000 a year toward the State Mining Bureau and put it on a good firm basis immediately. Now it is suffering from lack of funds. The rooms are not sufficiently spacious for the wants of the museum, and larger apartments have become necessary.

It is to be hoped that members of the Legislature will see fit to appropriate the sum mentioned toward the Bureau, now one of our most useful State institutions. The mining interest of the State will be ultimately benefited by this money. The Bureau has shown itself a useful and practical institution. The number of daily visitors is gradually increasing as the Bureau becomes known, and the accumulation of specimens has been so rapid as to outgrow the convenience for their reception.

The collection formerly at the State library, and what has been turned over to the bureau by the Legislature, cost over \$20,000. Mr. Hanks has not had it moved here because his rooms are not large enough for the important addition.

We sincerely hope that this important appropriation will receive proper consideration, and that the Bureau will receive the money it so much needs. The Bureau is not only a place for the exhibition of minerals. Its officers answer correspondence of all kinds relating to mining and metallurgy; they collect information on these subjects to be published in future reports; collect books and maps, and in fact attend to all those things connected with the mining interests, which should have long ago received proper attention.

## Trade-Marks.

When, last year, the courts decided that the existing laws relative to United States trade-marks were unconstitutional, those persons whose trade-marks had become of great value to them in their business, were naturally much chagrined. Many trade-marks had become so well known as to be worth thousands and thousands of dollars to their owners. It was like taking, in many instances, half the capital out of the business, to make the trade-mark valueless by removing the exclusive right to its use. The declaration of unconstitutionality of the law which gave originators vested rights in their trade-marks, was the cause of profound regret; yet at the same time it was felt that the Government, having received money for granting the privileges, would ultimately provide a law to meet the requirements, which would be constitutional.

A new act was carefully prepared and passed by the 46th Congress, receiving the approval of the President on the 3d of March. The Patent Office is now engaged in preparing rules and forms for the information and guidance of persons seeking to register their trade-marks. As soon as these are finished, applications for registration can be forwarded, and the MINING AND SCIENTIFIC PRESS Patent Agency will be prepared to prosecute Government trade-mark cases as formerly.

An examination of the law shows that it differs from the act of 1870 on the subject, in that it authorizes the registration of trade-marks

only by persons who are owners of trade-marks which are used in commerce with foreign countries or with the Indian tribes, and who are domiciled in the United States or in a foreign country which, by treaty, convention or law, permits citizens of the United States to register trade-marks. The new act seems to have been drawn in substantial acknowledgment of this propriety of the decision of the Supreme Court, which held that Congress had no right to regulate even the registration of trade-marks by citizens of the United States who were dealing only within this country. Owners of trade-marks which are chiefly or entirely used on merchandise of home consumption are, as heretofore, protected by common law, while the Registration Act merely authorizes the registration of trade-marks that relate to merchandise used in foreign commerce.

This following is the full text of the new law:

Be it enacted by the Senate and House of Representatives of the United States in Congress assembled, That owners of trade-marks used in commerce with foreign nations or with the Indian tribes, provided such owners shall be domiciled in the United States or located in any foreign country or tribes which, by treaty, convention, or law, affords similar privileges to citizens of the United States, may obtain registration of such trade-marks by complying with the following requirements: First, By causing to be recorded in the Patent Office a statement specifying name, domicile, location and citizenship of the party applying; the class of merchandise and the particular description of goods comprised in such class to which the particular trade-mark has been appropriated; a description of the trade-mark itself, with fac-similes of the mode of the mode in which the same is applied and affixed to goods and the length of time during which the trade-mark has been used.

Second, By paying into the Treasury of the United States the sum of \$25, and complying with such regulations as may be prescribed by the Commissioner of Patents.

Sec. 2. That the application prescribed in the foregoing section, must, in order to create a right whatever the favor of the party filing it, be accompanied by a written declaration verified by the person, or by a member of a firm, or by an officer of a corporation applying, to the effect that such party has at the time a right to the use of the trade-mark sought to be registered, and that no other person, firm, or corporation has the right to such use, either in the identical form or in any such near resemblance thereto as might be calculated to deceive, that such trade-mark is used in commerce with foreign nations or Indian tribes, as above indicated; and that the description and fac-similes presented for registry truly represent the trade-mark sought to be registered.

Sec. 3. That the time of the receipt of any such application shall be noted and recorded. But no alleged trade-mark shall be registered unless the same appear to be lawfully used as such by the applicant in foreign commerce or in commerce with Indian tribes, as above mentioned, or is within the provision of a treaty, convention, or declaration with a foreign power; nor which is merely the name of the applicant; nor which is identical with a registered or known trade-mark owned by another and appropriate to the same class of merchandise, or which so nearly resembles some other person's lawful trade-mark as to be likely to cause confusion or mistake in the mind of the public, or to deceive. In an application for registration the Commissioner of Patents shall decide the presumptive lawfulness of claim to the alleged trade-mark; and in any dispute between an applicant and a previous registrant, or between applicants, he shall follow, so far as the same may be applicable, the practice of courts of equity of the United States in analogous cases.

Sec. 4. That certificates of registry of trade-marks shall be issued in the name of the United States of America, for recording in the Patent Office, and the interior, and shall be signed by the Commissioner of Patents, and a record thereof, together with printed copies of the specifications, shall be kept in books for that purpose. Copies of trade-marks and of statements and declarations filed therewith and certificates of registry so signed and sealed shall be evidence in any suit in which such trade-marks shall be brought in controversy.

Sec. 5. That a certificate of registry shall remain in force for 30 years from its date, except in cases where the trade-mark is claimed for and applied to articles not manufactured in this country, and in which it receives protection under the laws of a foreign country for a short period, in which case it shall cease to have any force in this country by virtue of this act at the time that such trade-mark ceases to be exclusive property elsewhere. At any time during the six months prior to the expiration of the term of years of such certificate of registry it may be renewed on the same terms and for a like period.

Sec. 6. That applicants for registration under this act shall be credited for any fee or part of a fee heretofore paid into the Treasury of the United States with intent to procure protection for the same trade-mark.

Sec. 7. That registration of a trade-mark shall be prima facie evidence of ownership. Any person who shall reproduce, counterfeit, copy, or colorably imitate any trade-mark registered under this act and affix the same to merchandise of substantially the same description and properties as those described in the registration shall be liable to an action on the case for damages for the wrongful use of said trade-mark at the suit of the owner thereof; and the party aggrieved shall also have his remedy according to the course of equity to enjoin the wrongful use of such trade-mark used in foreign commerce or commerce with Indian tribes, as aforesaid, and to recover compensation therefor in any court having jurisdiction over the parties, or in the Supreme Court of the United States. The United States shall have original and appellate jurisdiction in such cases without regard to the amount in controversy.

Sec. 8. That no action or suit shall be maintained under the provisions of this act in any case when the trade-mark is used in any unlawful business or upon any article injurious in itself, or which mark has been used with the design of deceiving the public in the purchase of merchandise, or under any certificate of registry fraudulently obtained.

Sec. 9. That any person who shall procure the registry of a trade-mark, or of himself as the owner of a trade-mark, or an entry respecting a trade-mark, in the office of the Commissioner of Patents, by a false or fraudulent representation or declaration, orally or in writing, or by any fraudulent means, shall be liable to pay any damages sustained in consequence thereof to the injured party, to be recovered in an action on the case.

Sec. 10. That nothing in this act shall prevent, lessen, impair, or avoid any remedy at law or in equity which any party aggrieved by any wrongful use of any trade-mark might have had if the provisions of this act had not been passed.

Sec. 11. That nothing in this act shall be construed as unfavorably affecting a claim to a trade-mark after the term of registration shall have expired; nor to give cognizance to any court of the United States in an action or suit between citizens of the same State, unless a trade-mark controversy is used on goods intended to be transported to a foreign country, or in lawful commercial intercourse with an Indian tribe.

Sec. 12. That the Commissioner of Patents is authorized to make rules and regulations and prescribe forms for the transfer of the right to use trade-marks and for recording such transfers in his office. The citizens and residents of this country wishing the protection of trade-marks in any foreign country, the laws of which require registration here as a condition precedent to getting such protection there, may register their trade-marks for that purpose as is above allowed to foreigners, and have certificate thereof from the Patent Office.

Approved March 2, 1881.

## An Important Mining Decision.

Judge Sullivan on Wednesday decided the case of John H. Burke et al. against James C. Flood, the Con. Virginia Mining Co., James C. Flood and James V. Coleman, executors of the last will and testament of William S. O'Brien, deceased.

This suit was for the alleged conversion to their own use, by the bonanza firm, of about 70 ft. of mining ground, which, while acting as trustees of the company, they purchased for their own account, instead of for the company.

The principles involved in this suit are of greater importance than the money question, in which respects it is the least of the several suits instituted by the stockholders. Counsel on both sides occupied several days in the discussion of its legal aspects, and the Court devoted a week specially to the investigation of authorities and making up its decision, which will probably go to the Supreme Court for revision.

The other suits, relating to the claims for slimes and tailings, the milling of the ore, furnishing supplies, etc., for which some thirty or forty million of dollars are claimed, have yet to be tried, and are the main matters of contest.

This decision, if sustained by the higher courts, will result in the restoration to stockholders of the bonanza mines of about \$1,000,000. This dividends that have been paid on the 9,000 and odd shares of Con. Virginia and California amount to \$693,278.50, which, with interest to date, will swell the restitution to a round million.

The following is a carefully prepared abstract of the decision.

### Statements of the Complaint.

A great deal is charged in the bill, and much more was stated in the argument of the propositions of law involved in this case, to the effect that the members of the firm of Flood & O'Brien had in these transactions been guilty of actual, intentional, willful fraud, had been guilty of a deliberate attempt to defraud the corporation, defendant and its stockholders of their property. I do not think that the evidence justifies the charge of actual or willful fraud. The ground which was sold to the corporation defendant by the defendants was sold for exactly the same equivalent as was paid to every other party conveying ground to the corporation. Accordingly in what follows, I shall treat of these transactions as constructively fraudulent, and not as actually or willfully fraudulent.

### The Defense.

In the outset it is urged against this bill that the plaintiff has no right to maintain this action, because if any individual stockholder has a right to maintain such an action, he must be one who was a member of the corporation at the time of the alleged misappropriation of corporate assets, or, at all events, some one to whom such stockholder has assigned his right of action. This ground of objection is not a new one in actions of this kind.

### Dividends and Transfer.

On an accounting with the corporation and a distribution of its dividends among its stockholders, the dividends are not to be awarded to those who may long since have been stockholders, but to those who at the time of the distribution are possessed of the title deeds to its assets in the shape of certificates of stock. A transfer of a certificate of stock carries with it all the rights or claims which the holder has against the corporation. It is not necessary for him to make any formal assignment of a right of action against faithless directors. The instant he ceases to be a stockholder his right of action in a representative capacity ceases, and that of his successor begins.

### Who Caused the Injury.

But counsel for defendants contend that in no such controversy as the present can an individual stockholder institute and maintain an action of this kind. This injury, if any, which has been sustained, has been sustained by the corporation itself, they claim. If one person has sustained the injury, what right has another to intrude himself into the controversy and to arrogate to himself the fruits of the contest? The corporation, it is said, makes no complaint against its directors; why, then, should anyone else complain? Some confusion has arisen in considering this question, from the fact that this intangible, invisible, incorporeal entity which we term a corporation, has been invested with a character of mystery, by which it segregates itself from its constituent elements and retires from responsibility the exponents of its power.

### Asserting Rights.

Ordinarily, it is true, the corporation must assert its own right; and this it does through its directory or managing body, and the individual stockholder if bound by the action of the directory in the interest of the majority or ruling power of the corporation. Under normal conditions of honesty and regard for the law, the stockholder is held to have surrendered his individual judgment and interests to the presumably better judgment of the governing body. But the history of institutions of this kind proves that power perpetuates itself, and sometimes at the expense and entire disregard of justice and common honesty. Corporations have too often been the instruments by which bold and scheming men have under the forms and sanction of the law appropriated to their own use the property of their unsuspecting neighbors.

### Majority Power.

The unrestrained power of the majority in a corporation would lead to the absolute spoila-



tion of a defenseless minority. But the weak and the defenseless are always the special wards of the Chancellor. The more defenseless the suppliant who invokes the aid of the Chancellor, the stronger is the aim of the Chancellor to sustain him. Where the managing body of the corporation are guilty of fraud or oppression or gross disregard of the law, courts of equity will administer relief on the complaint of the individual stockholder. Courts of equity, in such cases, take a common sense view of matters, and regard the assets of the corporation as being in reality the property of the entire body of stockholders.

#### Court Interposition.

If it appears that the managing power of the corporation, acting in concert with an overpowering majority, are disregarding the dictates of honesty and fair dealing, and appropriating to itself the property of the minority, a court of equity will interfere at the suit of a single stockholder, howsoever small his proprietary interest in the corporation.

#### Rights of Directors of Corporations.

Have directors of corporations a right to deal with the corporations of which they are directors, for their individual profit, as distinguished from the profit realized by the body of stockholders? It would seem that it would be useless to discuss this proposition at any length. Our own Supreme Court has considered this question on a number of occasions, and its opinion on the subject is in accordance with the vast preponderance of authority.

#### Breach of Trust.

Measured by these rules, the conduct of the defendant Flood in making the sale to the company of which he was a director was a breach of the trust under which he held the office of Director. If from any of these transactions he realized a profit not common to the other stockholders or the corporation, he and those jointly interested with him in the transaction became answerable as involuntary trustees to the corporation for the amount of the profits so realized and the avails of such profit. Directors realizing secret profits from sales to the corporation, are as to the fund so realized the trustees to a constructive trust, and not as trustees of an express trust.

#### The Assets a Trust Fund.

Thus far we have reached this position: That a director is a trustee for the corporation and for the body of stockholders, and that the assets constitute a trust fund; that he is not permitted to deal with the trust fund for his own benefit; that if he does so deal with the fund for his own benefit he is guilty of a breach of trust, and he holds the profits of such transaction under constructive trust; that the corporation may call on him to account for such profits, and that in the event of failure or refusal by the corporation to exact an accounting by reason of its being under the control of the recent trustees, an individual stockholder may maintain the action. All this being assumed, it remains to be determined whether the defenses set up by the answer, and presented at the trial avoid or defeat the right of plaintiff in this action to a recovery.

#### Laches and Limitations.

The defense relied on are laches and acquiescence, ratification and the statute of limitations. These several defenses are clearly connected; they all tend to the proposition that, conceding that a valid claim ever did exist against the trading trustees, the same has been lost by lapse of time, or through the action or non-action of the corporation and its stockholders.

I do not consider that the evidence in this case discloses any such laches or acquiescence as would bar a right of action, unless it should be continued during the entire period fixed by the statute of limitations.

#### Ratification.

Ratification of a wrongful act of the trustee would in proper cases, and under proper circumstances, amount to a condonation of the offenses charged, and would operate as a release of any cause of action. But it is not every attempt to ratify which constitutes a ratification. The admitted facts of this case show that during all the time intervening between these transactions and the time of suit brought, the defendants, other than the corporation controlled and directed the corporation. It would seem to follow from that fact that any act of ratification in order to estop the corporation or its minority (!) stockholders from maintaining an action of this kind, would have to be something else than the action of the controlling majority. Otherwise it would follow that a director who could control a majority vote of the corporation could ratify his own wrongs, and present the spectacle of trustee defeating the rights of his *cestui que trust* by the operation of his own will.

Action of all the Stockholders Required. The ratification which will bar an action must be a ratification by the whole body of stockholders; the action of a majority is not sufficient. It must be the solemn and deliberate action of such whole body of stockholders done with a knowledge of the facts.

Several resolutions of ratification were adopted at the annual meeting of the stockholders of the corporation defendant. They are in my judgment acted upon by the parties participating in the matter with a sufficient knowledge of the facts, and so far as was requisite, with a sufficient knowledge of the law to have given them validity as a bar to this action.

But they lacked what is deemed by the law to be an essential requisite to their efficacy.

No ratification was ever made by the unanimous action of the body of stockholders. Even the large vote which was recorded in favor of the resolutions of ratification is not a reliable evidence of the wishes of stockholders acting at the meeting.

#### Votes by Proxy.

Much of the stock was voted by proxy, and the proxies, as far as appears from the evidence, conveyed no power to vote in the matter of ratification. Again, these proxies, which were collected by the management and in the interest of perpetuating in power the office-holding department of the corporation, were not in all cases evidences of authority, even in the matter of the election of officers, from the actual owners of the stock. The Secretary of the defendant testified that a good deal of the stock that was represented by proxy at these meetings was stock which stood in the names of parties as trustees, who held no beneficial interest in the stock that they authorized to be represented by proxy.

A ratification adopted in that way cannot with any regard for honesty of expression be said to have been adopted by the body of stockholders. Under these authorities I must hold that the resolutions adopted at the stockholders' annual meetings do not constitute any such ratification as would defeat this action. The fact that the stockholders permitted disinterested bank clerks to attend by proxy at stockholders' meetings and vote where they had no interest, might be evidence of laches, but it is not ratification.

#### The Question of Constructive Trust.

As before stated, the matters of trust in question here are matters of constructive trust. As such, they are unquestionably subject to the operation of statutes of limitation. In order to set the statutes in operation, there must be either knowledge of the facts out of which the trust arises or such means of knowledge as the law deems equivalent to knowledge, and declares to be constructive to notice.

Means of knowledge, from which a person of ordinary diligence would have ascertained the actual facts, are deemed such constructive notice as to set the statute of limitations in motion. Section 19 of the "Civil Code" is as follows: "Every person who has actual notice of circumstances sufficient to put a prudent man upon inquiry as to a particular fact, has constructive notice of the fact itself in all cases in which, by prosecuting such inquiry, he might have learned such fact."

It remains now to be seen whether in this case the injured party had knowledge of the character of the transactions involved, or the means of knowledge at such a date as would have allowed the statutory period of limitation to run against the claim before suit was brought.

#### What the Books Show.

In the case of all the transactions except one, enough appeared on the record book to set any reasonable man upon inquiry if he desired to question the sale by the director to the corporation. The minute books of the corporations show that the sales, with the exception mentioned, were made in the interest of J. C. Flood, and that he received the purchase price which was paid for the ground.

#### Exception of the Kinney Transaction.

In the case of all the transactions, except the George W. Kinney transaction, I must hold that the statute of limitations began to run against the company's right to demand as according for the profits on those transactions from the time that the record of the transaction was spread upon the open minute books of the corporation.

Whether the period of limitations be three or four years (a point I do not decide), I consider that all right to recover on any transaction except that with Kinney is barred by the statute. Held that the Minority Stockholders had Actual Notice.

As to some of the transactions I must hold that the minority stockholders, the real party injured, had, if not actual notice, at least the means of informing themselves as to the facts. I have this opinion on what I conceive to be the law, to wit, that the record books of the corporation are notice to the stockholders of the matters therein recited.

It would seem to be the theory of the statute that these books shall serve the purpose of informing the stockholders of the conduct of the corporate business. I know of no reason why the owner of stock in a corporation is exempt from the obligation which the law imposes on everybody, of using the means of information at his hand. The law requires this record book to be kept open for him, and yet it is claimed that he has a right to shut his eyes to his own business and set the statute of limitations at defi-

ance for the purpose of resurrecting a constructive trust.

Whether the period of limitations be three or four years (a point which I do not decide), I consider that all right to recover on any transaction except that with Kinney is barred by the statute.

#### How the Accounting Must be Made.

This accounting must be to the body of stockholders constituting the corporation. If the accounting were to be to the corporation, controlled by a majority adverse to these proceedings, another ratification or release of claims might follow. Inasmuch as the theory of this action is that the stockholders are the real party in interest, and not the adverse managers of the corporation, the Court will direct that the accounting be to the stockholders directly.

#### The Decree of the Court.

Accordingly, all holders of stock at this date will be allowed 60 days after public notice, given by a master appointed by this court, within which to elect to take the benefit of the decree herein, and present their evidence of ownership. The court will provide in its decree that all parties failing to come in within that time shall be foreclosed of all claim against defendants, or either of them, arising out of the transactions considered herein. On the payment of the several amounts that may be determined to be due to parties electing to take the benefit of the decree herein, the defendants will be released from all claims against them arising out of said transactions, either on the part of said corporation or its stockholders.

The measure of the liability of the actual defendants is laid down in Section 2,237, "Civil Code": "A trustee who uses or disposes of the trust property contrary to Section 2,229, may, at the option of the beneficiary, be required to account for all profits so made, or to pay the value of its use; and if he has disposed thereof, to replace it with its fruits, or to account for its proceeds, with interests."

The 1203 shares of stock issued in this transaction became equivalent, by reason of the several increases in the capital stock of the defendant corporation, and the dividends of California stock issued to the stockholders of defendant corporation, to 6,125 shares of the stock of the corporation defendant, and 3,573 shares of the stock of the California Mining Co. Defendants other than the corporation are to account for said shares of stock or their value at this date, and for all dividends paid on said shares of stock as shown by the evidence in the trial, together with interest on such dividends from the dates of payment. Defendants are to be credited with \$3,539, actually paid for the ground, with interest thereon from April 12th, 1872.

SULLIVAN, Judge.

#### Saving Float Gold.

Joseph Wilkins, of Baltimore, Md., has devised an apparatus for saving float gold, which is herewith illustrated. The main feature is to compel the gold to come into contact with the mercury.

A is a pan constructed of any suitable material, from the bottom of which lead pipes, DD, the lower ends of which are secured to a disk, B, having perforations.

In operation, the water to be treated is led into a tank, wherein the sand and heavier particles of dirt and impurities are allowed to subside. The float gold, which is all that its name implies, as it remains suspended for an almost indefinite period, remains in the water, which, when reasonably free from impurities, is led into the pan, A. Previous to this the pan has been newly filled with mercury, the disk, B, which is maintained truly horizontal as shown by a pair of levels, CC, being immersed to the depth of say, three or four inches, whereby an upward pressure of about two pounds to the inch is secured on the lower surface.

The pipes, D, are made of a length to admit of the downward flow of the water—say from 18 to 20 times the mercuric head—the specific gravities of water and mercury being to each other respectively about as 1 to 14.

The water from the pan, A, flows downward through the pipes, D, and out under the disk, B.

Instead of assuming the form of spherical masses and bubbling swiftly to the surface, as it would do were the pipes simply immersed in the mercury without the disk, the water spreads itself into a thin sheet under the disk, whereby every part of it is brought into contact with mercury and any suspended gold, is amalgamated and retained.

The water flowing from the pan F, may be led into the upper pan, A, of a second amalgamator, and thence to a third.

The gold is reclaimed from the mercury by the usual methods. With careful management there is little or no waste of mercury.

The device is simple and inexpensive, being conveniently formed by screwing one end of a piece of gas-pipe into the bottom of a tub and the other into a disk, and immersing the latter in a body of mercury contained in a second tub.

The device requires no care or attention except to remove the saturated mercury and supply fresh, and the use results in a more complete recovery of gold, which has by the process in use heretofore, been wholly lost.

There is nothing new in forcing auriferous material through mercury, a screw conveyor or equivalent mechanism being used to drive the material through a pipe whose lower end is immersed in a mass of mercury, and to such the inventor lays no claim. Moreover, flanged revolving disks immersed in mercury and stationary perforated disks similarly immersed, have been used in recovering gold from auriferous water, but this particular device we have not before seen.

#### Leaching Gold and Silver Ores.

The new work of Mr. C. H. Aaron on the leaching of gold and silver ores, (the Plattner and Kiss process), is a very practical treatise, published by A. J. Leary, of this city. The book was written to supply the want of a plain, practical work on the subject. In the standard works on metallurgy, especially in regard to gold and silver, there is great lack of those details so essential to success.

This condition of affairs Mr. Aaron thinks is due in part to the circumstance that books are less often written by mechanical workers in this branch than by scientific gentlemen who obtain such details as they do give us, not from their own experience, but by inquiry and observation, more or less extensive. It is also in part owing to the fact that in Europe, where most of the books were written there are fewer men who are called on to conduct metallurgical operations without previous apprenticeship to the business.

In the arrangement of the work the author endeavors to make the necessary explanations and practical directions as simple and straightforward as possible, while matter, which, however interesting or instructive, is not essential, appears toward the end, in a separate division. The work is illustrated plainly, but the engravings are new, there being no "padding" with familiar cuts. Mr. Adams' hook is really a very practical and exceedingly useful one. It will be found valuable to anyone interested in leaching or roasting gold and silver ores; and, in fact, to anyone interested in metallurgy. We make the following extract on "Loss in Roasting," to show the style of writing:

The only reliable method of determining the loss of gold or silver in the roasting of ore on the large scale is to dry, weigh, sample and roast a quantity, say from one to ten tons; then after cooling to weigh and sample again. It may weigh more or less than before, according to the character of the ore, the quantity of salt used, and the manner of roasting. The assay of the unroasted ore, coupled with the total weight taken, gives the quantity of precious metal in the lot before roasting and the assay of the roasted ore, with its total weight gives the quantity remaining after roasting. The difference is the loss, caused by dusting and volatilization. To make the test reliable, the furnace must be thoroughly cleaned both before and after the roasting; if this is neglected the weight obtained for the roasted ore will be incorrect.

As a part of the precious metal lost in the roasting may be recovered from the fines and dust chamber, while, besides the losses already discussed, others may occur in the leaching, collecting and melting of the metal, it will be seen that a final result can only be reached by means of a general and complete clean-up; yet, as this cannot be had very frequently, the investigations described are indispensable as guides in working.

It is best when any doubt is entertained as to the best way of roasting a given ore, to experiment in the laboratory on ounce or half ounce samples taken from crushed lots of considerable magnitude. The method employed by some metallurgists, of taking samples from the furnace at intervals during the progress of the roasting, and assaying them with the view of ascertaining the loss at successive stages, is open to the objection that it cannot be known exactly what correction must be made for the changes of weight sustained by the ore. It is however very proper to make such trials, because a heavy loss might be thus indicated in time to alter the treatment of the charge. The percentage of the silver which is soluble must be considered in connection with the loss by volatilization, in order to arrive at the most profitable manner of roasting; for it is better to make rich rather than poor tailings, if the difference should go up the smoke stack.

A. Bateman (brother of Ike Bateman) and Kenny Allen, both large miners of North Diablo and Northern Belle mines, Nev., have bought the Brush Creek quartz mine, near the Mountain House, Sierra Co. and intend to push work vigorously ahead.



## Miners' Wages.

The question of miners' pay is attracting a good deal of attention in Nevada and Utah, and the problem as to whether it would be better for the country if a lower rate of compensation than \$4 per day was instituted, is being discussed pro and con by the press. Those in favor of reduction claim that it would enable companies to employ a greater number of men, work ground that will not pay to work at the present rate of wages and prospect new ground with the possibility of striking bonanzas. These advocates of low wages seem to lose sight of the fact that mining is speculative and fluctuating and that it is impossible to base the rate of wages on the output of the mines.

If wages are small when the mines are not paying, will they be proportionately increased when bonanzas are struck? We think not, as we have yet to hear of the first instance of the kind. It is a well-known fact that the prosperity of a mining camp depends comparatively little on the output of the mines, and if such were not the case, the wages paid miners constitute but a small item in the expense of working mines. The bulk of the cost is embraced in money paid for timbers, powder and other supplies, together (in many cases) with extravagant salaries paid figurehead Superintendents and officers to sit around stoves and tell what they know about mining. We are unalterably in favor of a high rate of compensation, and the employment of none but first-class workmen. Let incompetents and "snides" seek their level.

A good, competent miner, by his superior judgment in breaking ground, taking down and saving ore, the judicious use of supplies and the greater amount of work he can accomplish, can more than save his salary to his employer over the man who does not understand his business. The men who pass a great portion of their lives underground, and have the daily dangers incident to the extraction of the ore, are worthy of ample recompense. The money paid the laborer is spent where it is earned, in the support and education of his family, and proves a benefit to the entire community, while that secured by corporations is taken from the country and finds its way into the great reservoirs of wealth, benefitting the few. Give us high wages and competent workmen in every branch of business, for you may look the world over, and you will find the most prosperous communities where this is the rule.—Owyhee Avalanche.

The coming International Electrical Exposition at Paris promises to be a great success. Among the applications for space has been that of the California Electrical Works of this city.

## Business Directory.

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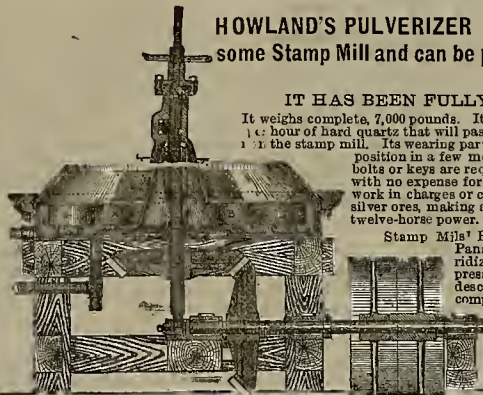
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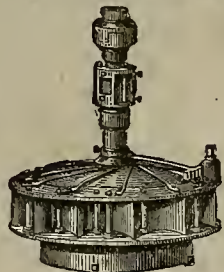
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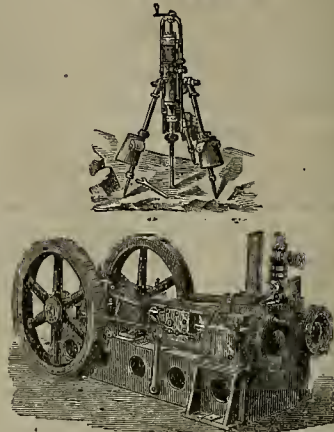
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### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR WEEK ENDING MARCH 16th, 1881.

- 233,847.—VELOCIPED SPRING—G. G. Buckland, Tulare, Cal.  
 233,763.—WATER WHEEL—G. J. Collins, Grass Valley, Cal.  
 233,765.—LEMON SQUEEZER—R. H. Daly, S. F.  
 233,864.—WOOL WASHER—J. T. Davis, S. F.  
 233,875.—SAWING MACHINE—G. M. and N. Fay, Eureka, Cal.  
 233,916.—EXPLOSIVE COMPOUND—F. C. Kiel, S. F.  
 233,789.—WINDMILL—F. W. Krogh, S. F.  
 233,918.—BARK MILL—H. Kullman, S. F.  
 233,907.—WINDOW SCREEN—J. Reardon, Ione City, Cal.  
 233,907.—MONUMENT—T. Wagner, S. F.  
 233,818.—CARBURATOR—W. W. Walmsley, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

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The remark so frequently heard that "every thing now-a-days is done by machinery" is by no means a far-fetched expression, but, on the contrary, in strict accordance with the facts in the case.

Thus it takes machinery to make machinery, and so long as this is true, the demands of the operative will ever be widely in advance of the artisan.

Mr. Robbins founded his establishment in 1876, and by pursuing a policy of strict business integrity, he is now on the high road to competence and prosperity. An accomplished machinist himself, he has the personal oversight of an efficient number of experts in his employ, and as a just return therefor he is accredited with the reputation of turning out a style of work far superior to anything in his line which can be imported from the Eastern States.

Mr. Robbins knows better than censors themselves their every want, and they have but to submit to him their plans and specifications to receive their work in all its varied appointments, as soon as steam-power and skilled labor can fabricate it from the cold, unyielding metal.

The leading canneries and soap factories of this coast constitute his best references, and those persons contemplating the erection of these works need only to visit such establishments while in operation to gain an adequate idea of the superiority and finish of his handiwork.

Like other determined spirits in our city, he is doing much towards checking the importation of foreign and often inferior goods, and is thus largely ministering to the abiding good of our sovereign commonwealth by keeping money at home, where it ought ever to be found, for the promotion of local and domestic improvement.

### Glove Making in San Francisco.

The pioneer manufacturers of this city, in almost every line of industry, had to face a discouraging element quite unknown to the workers of to-day. As in all new countries and cities of unmaturing growth, there was a deep-seated prejudice against whatever was of home manufacture.

Messrs. Shoenberg & Co., of the Pacific Glove Works, established their factory here in 1869, and hence they are among our oldest manufacturers in this calling. Since, in those days, gloves of all grades were known only as one of the products of Eastern manufacture, the prejudice of which we have spoken was one of their great drawbacks. Local skill was brought under the ban of disrepute, and its products, when placed side by side in our markets with Eastern-made goods of no better quality, suffered a corresponding depreciation, and were often the last to leave the shelves of the retail dealer. A silly conceit prompted well-to-do consumers to see a morbid aristocracy in imported goods that was sure to smack loudly of glory and renown. But, thanks to the indomitable energy of our early adventurers in the various industries, such a state of things no longer exists. Old things have passed away, and all things become new. Especially can this change be seen in the glove-making business. So completely have the tables been turned, that San Francisco glove makers are now the acknowledged peers of their Eastern brethren, while New York, Philadelphia and Boston manufacturers are being put to their wit's end to devise means for reviving and keeping alive the ancient fair name of their own home productions. By strict attention to the wants of their customers, Messrs. Shoenberg & Co. have succeeded in amply satisfying jobbers as well as consumers that not only can gloves of all the various grades be made at a less cost here than elsewhere, but, on account of the superior quality of stock and certain processes in manufacture, they are, as a rule, much more durable than imported goods. As a natural consequence, our city jobbers are finding themselves compelled to close up their importing business and rely solely on the substantial home-produced article. But the change does not stop here. Large invoices of gloves made in this city are finding their way into Eastern markets, and although this is suggestive of the old taunt of sending coals to Newcastle, it is one of the realities of the day in which we live.

The Pacific Glove Works give employment to from 50 to 60 hands, mostly women and girls, and none other than white labor is utilized. This fact alone is highly creditable to the proprietors. The whole of the second floor of a building about 100x50 ft. is devoted to the works, and a walk through the various departments during business hours presents to the visitor a scene of well ordered industry. As to the material used, the huckskin is mainly of California production, while the kid and several other kinds of stock are shipped from Europe direct.

About \$50,000 worth of material is annually worked up, and during the same period no less than \$10,000 is paid to employees, thus adding its quota to the great aggregate of home circulation.

One of the specialties manufactured at these works is the "ladies' kid riding gauntlets," an article of peculiar make and nitting qualities which, once seen, are sure to be ever appreciated. Working gloves and the heavier grades are all hand made and sewed with a double waxed thread.

The goods of this firm find their way into all the markets of this coast, the Sandwich islands and, as we have intimated, many cities of the Atlantic States. Large orders are also received from Texas and the southwest border.

Finally, and in conclusion, San Francisco is indebted in no small degree to the glove making industry carried on in her midst, for her increasing reputation abroad as a city of manufactures and commerce.

The Chrysolite Mining Co. is now employing 250 men, and turning out 50 tons of ore daily. There is \$230,000 on hand, but it has been deemed best to defer the renewal of dividends for the present.

### Salt Lake City and the Adams District.

EDITORS PRESS:—Before entering upon the task assigned to me of giving a general and detailed account of late developments and prospects in the various mining districts of Utah, it might not be amiss to say a few words about Salt Lake City, the capital and chief city of the Territory. Zion, as it is commonly called among saints, as well as sinners, is regularly laid out at the foot of the great Wasatch range, only a few miles from the briny lake whose name it takes. The city was founded by the late Brigham Young and his devoted followers, in the year 1847, and now has a population of something over 22,000. It is the largest town between Omaha and Sacramento, and does a thriving business with mining camps, north and south. Among the many handsome edifices in this Rocky mountain metropolis, the Mormon temple and tabernacle are the first to attract a traveler's attention. The former, which it will take two or three years more to complete, is being built of hewed granite from Cottonwood canyon, with walls eight ft. in thickness. The foundation embraces an area of 186x99 ft., and it will have a tower 225 ft. high. The large tabernacle is one of the oddities of the continent, being 250 ft. long by 150 ft. wide, and covered by a dome-shaped roof, which stands 62 ft. above the ground. There is not a single pillar about the structure, and its seating capacity is estimated at 14,000.

The peculiar institution known as Mormonism is not the proper subject for the pages of a mining journal, so that I must forego my desire to refer to it; yet I cannot help agreeing with Artemus Ward when he said that the Mormon religion is somewhat singular, although their wives are plural.

An object of greater interest to a mining man than the religious creed or teachings of a priesthood is the Utah museum of minerals, ores and natural curiosities, which is situated opposite the tabernacle, on South Temple street. It contains a large collection of almost everything found in the mountains, lakes and deserts of Utah, scientifically arranged and labeled in numerous large cabinets. In one of these are shown specimens of the minerals of this region. The quartz specimens are grouped on the west side, where the several forms of silica may be seen in great variety. In the center gold, silver, sulphur and native elements are seen. Rock salt, transparent as glass, gypsum, salt from the Great Salt Lake, etc. Copper and lead from the mines of Utah, with samples of azurite and malachite take up the east side of the cabinet and are specially attractive. In another place may be seen the different varieties of silver and gold-bearing ore from the several mining districts in the Territory. There are the famous Silver Reef ores; silver-bearing sandstones, which are curious and new to science, and ores from the Ontario and other noted mines.

The museum also contains the reptiles and insects of Utah and many such natural wonders as the curious mountain alligator, the horned toads, the mud puppy, or "fish with legs," etc., a rare collection of coins, birds, shells, relics and curiosities relating to the early history of the Latter Day Saints, and antiquities from both hemispheres. Four cabinets are devoted to ethnological exhibits and the Stone Age, while the one set aside for studies in Paleontology, is filled with a rare collection of fossils. In yet another are rare and beautiful specimens of sulphides, calcite and silicates, crystals, petrified moss, etc.

This winter which, with its snowy wreaths, may still be said to linger in the lap of spring, has not been quite as relentless as some of its predecessors. Yet the snow fall has been heavy in some parts of the Territory, and particularly in the Cottonwood canyons. Travel by rail to Alta has been impeded since December, when the shade along the road caved in from snowslides.

In Adams mining district, which is the nearest to this place, being distant about seven miles in a northeasterly direction, very little has been done since last season. The four principal mines known as the Henry, Eureka, Lawrence and General Scott are the property of H. W. Lawrence, Esq., employ from six to ten men, and have proved very profitable to their owner. They lie in the same group, and have been opened through a main tunnel which now extends some 300 ft. Shafts have also been sunk to a depth of from 200 to 300 ft. on a ledge varying from two to four ft. in width. The ore is mostly low-grade galena, carrying from \$12 to \$15 silver to the ton, but at the head of the tunnel assays have been made as high as \$90, showing that a richer body of ore awaits the pick and drill. The formation is principally limestone, with here, as elsewhere, large porphyry dykes crossing the formation. The Blanche and Red Bird are also promising mines in the same district, but I cannot learn what developments are being made in them.

A. L. M.

A NEW and important manufactory has been started at San Leandro, which will materially benefit that burgh as well as Alameda county. It is the San Leandro Plow Co., with a capital stock of \$100,000. The following named gentlemen have been elected Trustees: T. P. Carey, S. Huff, L. C. Morehouse, John F. Stone, Robert Farrelly, F. Meyers and George Smith. The factory will afford employment for 20 mechanics when in operation, which will be in a couple of months.

### The Mechanics' Fair.

The great extension of the railways of the Pacific coast within the past few years and the opening up of new mining and agricultural regions has increased the population of the Pacific coast materially. San Francisco as its business center needs now, more than ever, to show up its industrial enterprises, its manufacturing capabilities and its commercial advantages. Thousands of strangers will visit us this summer, many of them looking for homes on these shores. As a consequence, the industrial fairs of the Mechanics' Institute give to exhibitors an unequalled opportunity of bringing their goods under the notice, direct and personal, of the people of the entire coast.

The Board of Managers now makes public announcement that the Sixteenth Industrial exhibition of the Mechanics' Institute of San Francisco, will open on Tuesday, August 2d, and after continuing four weeks and four days, will close on Saturday, September 3, 1881.

### The Managers offer to

Exhibitors upwards of 175,000 square feet of floor space, where every article useful, rare or beautiful may be advantageously displayed without charge for space. Every facility is given to exhibitors of machinery to show the same in motion, and steam power and water are furnished free when required.

Visitors in search of amusement or instruction will find an immense variety of objects of interest in the Machinery Department and the Art Gallery. This Art Gallery has always been exceedingly popular, the gallery being a spacious, well-lighted apartment, especially adapted to the display of pictures. In the Horticultural Garden will be collections of ferns and rare exotic plants, tastefully arranged, with choice collections of cut flowers and flowers in pots. A special effort will be made this year to worthily exhibit the fruits and wines of California.

A fine band of music will add to the enjoyment of visitors every afternoon and evening. Blank applications for space, a copy of the rules and regulations, and any other desired information will be given on application to the secretary, J. H. Culver, or the superintendent, J. H. Gilmore, 27 Post St. The pavilion will be ready for the reception of goods on Monday, July 22d.

### A Splendid Piece of Gold Plating.

An extensive and magnificent piece of gold plating, the largest ever done in the United States, and probably in the world, has just been completed by the San Francisco Plating Works, 653 and 655 Mission street, E. G. Dennison proprietor. This piece of work consists of a large copper cauldron and cover, of the capacity of 60 gallons. The value of the gold used in making the solution and anodes was upwards of \$4,000, and the value of gold put on the work \$2,500. This piece of work will be used for chemical purposes and is for one of the wealthiest corporations on the Pacific coast. The parties are highly pleased with the manner in which the work was executed. The San Francisco Plating Works have filled a great many orders of the largest description in gold, silver, nickel and copper-plating. These works are among the most extensive in the country. One of the specialties is the manufacture of silver-plated amalgamating plates for saving gold. These plates are extensively used in quartz, gravel and placer mining. The reputation of the plates made here is unequalled, having proved superior to all others. Mr. Dennison will be pleased to receive visitors at any time, to show and explain the process of plating and exhibit samples of work.

### News in Brief.

DAMAGING floods in Nebraska. LARGE fire in Orrville on Monday. EARL BEACONSFIELD is seriously ill. THE trout fishing season opened on the 1st inst.

A NUMBER of Socialists have been expelled from Berlin.

THE old houanza mines are now yielding over 100 tons per day of good milling ore.

COMMODORE SHUFFELDT, U. S. N., has been selected to reorganize the Chinese navy.

THE Fall River, Mass., Weavers and Spinners' Union has decided to pay the men on strike \$6 per week.

THE Treasury officials estimate the reduction of the public debt for March at not less than \$5,000,000.

Coyotes and California lions are killing numbers of sheep in the southern portion of Saa Benito county.

IN England the grand national steeple chase was won by Woolbridge, Regalia second and Thornfield third.

THE Indians are raiding in Tom Green county, Texas, and it is said that considerable damage has been done by them already.

AT Leeds, England, one of the largest flax mills, that of Hives & Tennant, is closed in consequence of depression in trade.

AN excursion is contemplated over the Carson and Colorado railroad on or about the 10th of April, when the ceremony of driving the last spike will be performed.



### Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omission of agents.

### Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolltho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St. S. F.

### Nothing short of Unmistakable Benefits

Conferred upon tens of thousands of sufferers could originate and maintain the reputation which AYER'S SARRA-PARILLA enjoys. It is a compound of the best vegetable alteratives, with the Iodides of Potassium and Iron, and is the most effectual of all remedies for scrofulous, mercurial or blood disorders. Uniformly successful and certain in its remedial effects, it produces rapid and complete cures of Scrofula, Sores, Boils, Humors, Pimples, Eruptions, Skin Diseases and all disorders arising from impurity of the blood. By its invigorating effects it always relieves and often cures Liver Complaints, Female Weaknesses and Irregularities, and is a potent renewer of vitality. For purifying the blood it has no equal. It forces up the system, restores and preserves the health, and imparts vigor and energy. For forty years it has been in extensive use, and is to-day the most available medicine for the suffering sick anywhere.

FOR SALE BY ALL DEALERS.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove, walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

The State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M. to 5 o'clock P. M., daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

### Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

**Lewis Consolidated Silver Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Pioneer Mining District, Pinal County, Arizona. Notice is hereby given, that at a meeting of the Board of Directors, held on the Twenty-third (23) day of March, 1881, an assessment, No. Four (4) of Six (6) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. Gold Coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Second (2) day of May, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Twenty-third day of May, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. PEW, Sec'y.  
Office, No. 310 Pine Street, Room 15, San Francisco, Cal.

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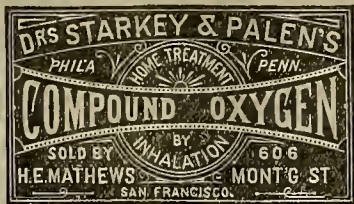
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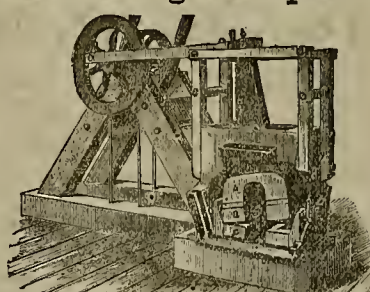
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A Treatise on Compound Oxygen, giving the history of this new discovery, and a large record of most remarkable cures, will be mailed free to all who ask for it. Also, "Health and Life," a quarterly journal, containing much interesting information. Write for it. Address the proprietors, DR. STARKEY & PALEN, 109 and 111 Girard street, Philadelphia, Pa., or H. E. MATHEWS, 606 Montgomery street, San Francisco, Cal., from whom can be procured both information and supplies.

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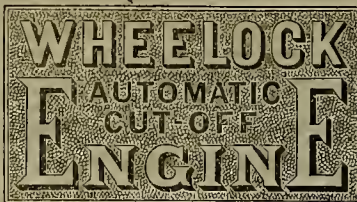
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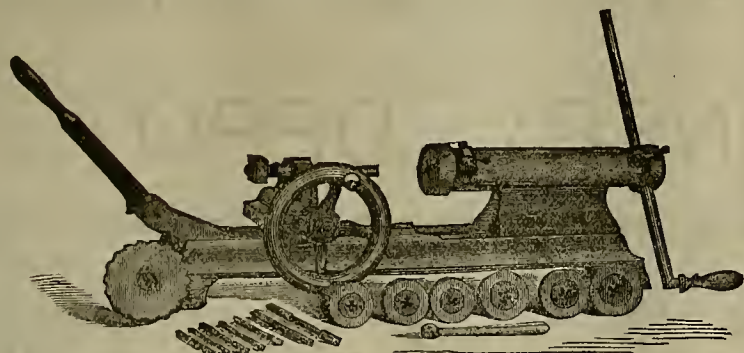
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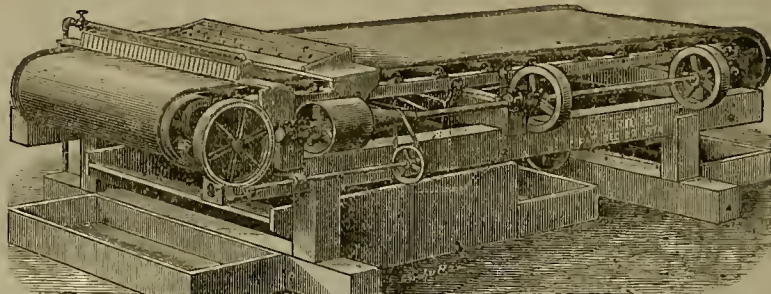
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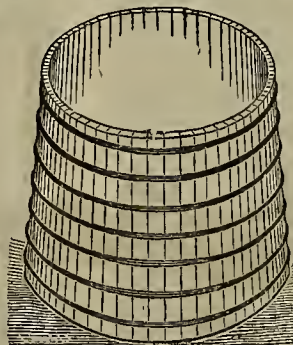
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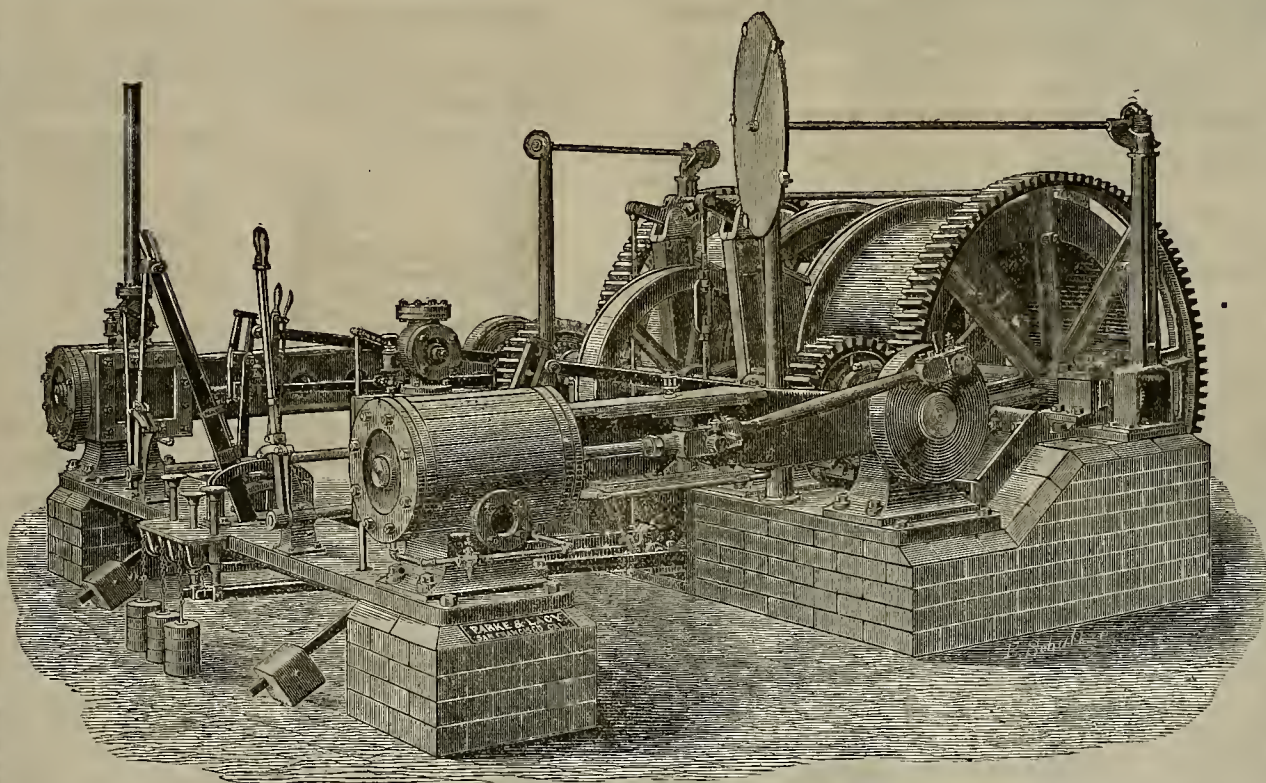
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 9, 1881.

VOLUME XLII  
Number 15.

## The De Bay Propeller.

Since the first introduction of the screw propeller, innumerable modifications of the original idea have been made, yet it is admitted that with the propellers in ordinary use, the full efficiency is not utilized. Among mechanical appliances for motive force, none has been more closely studied than this, yet the results of these studies have not been as satisfactory. When the De Bay system, which it is the purpose of this article to describe, was devised, it was so great a departure from custom and theory that few believed any great advantage would result. The system has gradually developed, however, from theory to experiment, from experiment to practice, and now even such an authority as *Iron* is forced to admit that the results of practice, as far as they have gone, stamp the invention as an important practical advance in screw propulsion. This journal, to which we are indebted for our engraving, records the fact, that to-day the theoretical idea of 1876 is found a practical success, with an important gain over the ordinary propeller to its credit. In view of these circumstances, a description and engraving of the De Bay propeller will be of interest to our readers.

The invention dates back no further than 1876. In that year Mr. De Bay took out a patent for a new form of propeller by means of which he designed to obviate the loss of power caused in the action of ordinary screws by the tangential current thrown off by them. This his invention claims to effect by the employment of two screws working in opposite direction, the blades of each screw having portions cut away to permit of the projections on those of the other screw passing through them. Our engraving which represents the propeller as fitted to the s.s. *Cora Maria*, illustrates the manner in which this is effected. The currents set in motion by the one screw are met by those produced by the other, the result being that the whole body of water is thrust directly astern in a line with the axis of the ship. The different motions to be imparted to the two screws must, in all cases where duplicate engines are not provided, necessitate the use of gearing; and against the prejudice that has so strongly prevailed to the employment of such an arrangement on board ship Mr. De Bay has had to struggle for some years. When he first submitted his invention to the notice of leading marine engineers and scientists, he was met not only by the objection to gearing of any description, but also by opposition on the ground taken by most of them, whose views were that the propeller itself was so weak that it would not bear any rough usage, such as it would be sure to meet with in a sea-voyage. He was also told that, granting its immunity from such dangers, it would be almost certain to be fouled by anything floating with which it might come in contact.

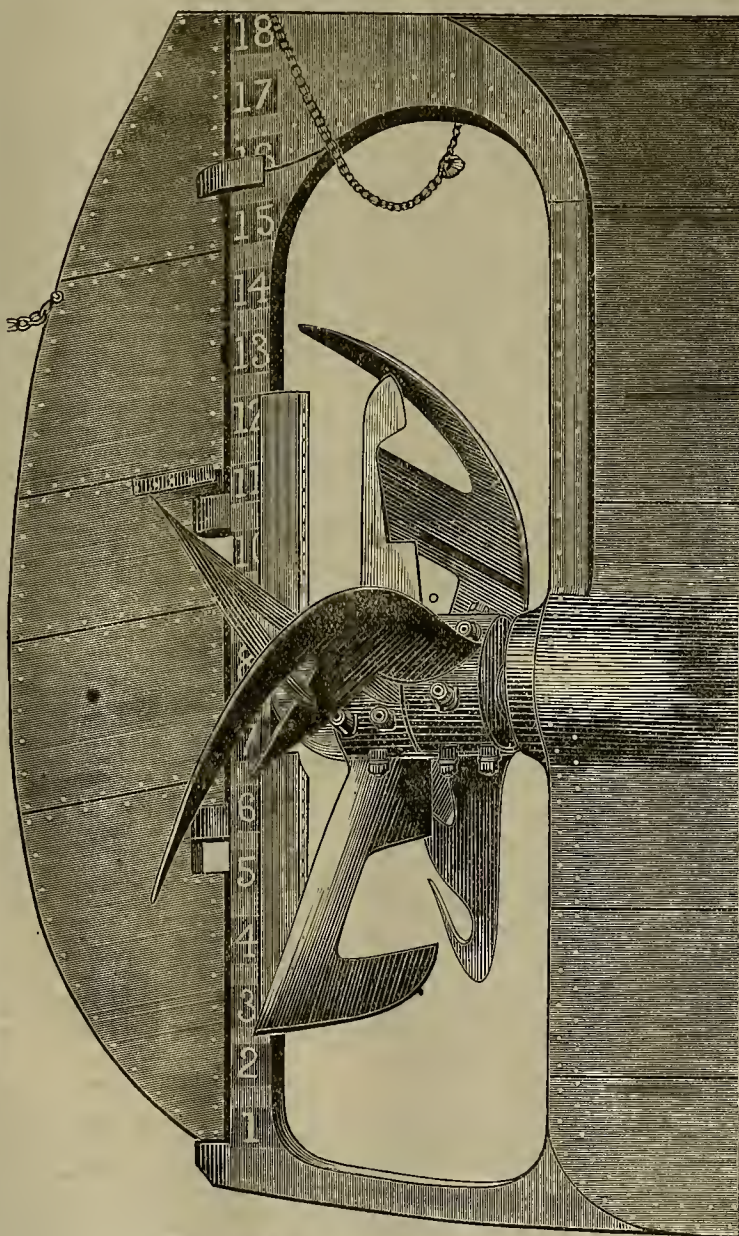
There were, however, a few less prejudiced persons who looked upon the invention with more favorable eyes, and in 1878 the company which had been formed for its development resolved upon having a series of trials made with the steam-launch *Eagle*, which was fitted with the propeller, and they entrusted the experiments to Mr. Folkard, M. Inst. C. E. The results reported by that gentleman induced the directors to try further experiments on a larger scale, and a screw collier, the *Elaine*, of about 600 tons burden, was fitted with the De Bay propeller, and made a successful run through rough weather from the north of England to the Thames. On her arrival there, however, it was found that the gearing had been so badly made that it was impossible to continue to drive the propeller with it.

The directors then had a series of trials of models conducted by independent and disinterested experts, in order to test the power of the De Bay propeller against that of the best known form of the ordinary screw. The result of these experiments showed a gain of 40% obtained by comparison with a model of the Griffith screw as fitted to the *Lord Warden*. So encouraging was this result that the steam yacht, *Isolair*, of 40.37 tons and 20-horse power, was hired and fitted with the De Bay propeller and improved gearing. The results of the trials conducted by

Mr. Folkard as the company's consulting engineer showed a superiority over the ordinary screw equivalent to a saving of nearly 30.5% in coal consumption. It was then decided to give the propeller the crucial test of a long ocean voyage in a large ship, and the *Cora Maria* was selected for the purpose. Her length is 235 ft;

parative statement, which we extract from Mr. Folkard's report:—

Four runs over course of 21-fifth miles, two with tide and two against. (Force of wind two to four.) Sea calm. The figures in the first column show the results of a trial made on the 10th of July, 1880, with the ordinary screw;



THE DE BAY PROPELLER.

main breadth, 31 ft, and depth 18 ft. 3 inches. She is fitted with two compound, inverted, direct-action, surface-condensing engines. The cylinders are 23 inches and 54 inches in diameter respectively, with a length of stroke of 3 ft., her power nominal being 110-horse power; her tonnage, net register, is 831 tons; displacement on 18-ft. mean draft, 2,800 tons; her ordinary screw had a diameter of 13 ft. 2½ inches, and a mean pitch of 19 ft. 6 inches; her De Bay propeller has a diameter of 11 ft., and a mean pitch of 18 ft.

A series of trial-runs was made with her at Cardiff last autumn, in order to obtain data as to her speed with the ordinary screw with which she was then fitted. These trials having been concluded, she was fitted with the De Bay propeller, as is illustrated in our engraving. The trials which followed gave very remarkable results, as will be seen from the following com-

and those in the second column the result of a trial made on the 10th of August, 1880, with the De Bay Propeller. Force of wind, three.

Total revolutions on 4 runs.....	4,279		3,314	
Average do. per minute.....	66.32		65	
Steam-pressure (average on 4 runs).....	71.7	lbs.	74.5	lbs.
Vacuum.....	25.53		24.25	
Indicated horse power.....	584.51		585	
Time.....	Min.	Sec.	Min.	Sec.
1st run, with tide.....	12	5	9	4
2nd " against.....	20	27	16	42
3rd " with.....	12	3	9	6
4th " against.....	19	55	16	10
Speed.....	Knots per hour		Knots per hour	
1st run.....	10.924		14.5	
2nd ".....	6.450		7.9	
3rd ".....	10.954		14.5	
4th ".....	6.620		8.1	
Turning the circle.....	72	lbs.	69	lbs.
Steam-pressure.....	25		24.5	
Vacuum.....	64		61.5	
Revolutions.....	Min.	Sec.	Min.	Sec.
Time.....	4	44	4	33
To port.....	4	51	5	4
To starboard.....	6			

Almost immediately after her trials with the De Bay propeller, the *Cora Maria* left for Alexandria and the Danube—Mr. Hiscock accompanying her as the engineer nominated by the company to watch and report on the working of the propeller and gearing during the voyage. The gearing with which she was then fitted, and which had been designed by Mr. Hiscock, failed to give satisfaction—not, however, from defect in design, but from faults arising from too hasty construction.

During the voyage to Alexandria, with 1,700 tons of cargo, thence light to the Danube, and home with a heavy freight of grain, that gentleman reports the propeller never to have caused him any trouble, and the saving of fuel he was able to compute, fully bore out the results obtained at the trials at Cardiff. The form of gearing adopted was considered to have proved itself unreliable; and Mr. Hiscock, on his return, designed a set of mitre-toothed gearing. The under shaft, which is of steel, and carries one of the screws, is a continuation of the main shaft, though of less diameter; and it passes through the hollow shaft of phosphor bronze carrying the other screw. The first-motion wheel is keyed on to the main shaft, and transmits a reverse motion to the third-motion wheel on the hollow shaft through the intermediary or second-motion wheel.

All these wheels, which were of three ft. six inches diameter, were cast of crucible steel; and all their bearings were upon a solid cast bed-plate firmly seated on the frames of the ship.

With this improved gearing the *Cora Maria* was fitted when she returned from her second voyage to Bremerhaven and back, on which the propeller was tested severely by meeting in the northern seas with the most tempestuous weather Captain Cawley, her commander, had ever experienced. Taking on board, at Cardiff, a cargo of coal of over 1,700 tons, the *Cora Maria* left that port for the Thames on the 6th of last month, and met on her journey up channel with the heavy storms which raged on the 7th and 8th of that month. Although considerably injured in her upper works by the force of the sea, the ship made a good run round to the Thames, beating all the steamers which started with her. A few days after her arrival, a large party of engineers and gentlemen connected with the shipping interest were present on board to observe the behavior of the propeller during a run from Gravesend to the Mappin and back. On this occasion the verdict was that there was a total absence of the vibration caused by ordinary screws, no stern wave or wash was perceptible, and the motion more resembled that of a sailing ship than that of a screw-steamer. The vessel's speed, as far as it could be tried in a heavy tideway and shallow water, fully bore out the results of the Cardiff trials.

The report of their consulting engineer has satisfied the directors that the De Bay Propeller Co. that owing to the success of the new gearing they have no further difficulties to overcome. During the trial on the Thames just referred to, although almost new and severely tried by the passage from Cardiff, it worked smoothly and without a sign of heated bearings. The owners of the *Cora Maria* are now so satisfied of the advantages of the De Bay propeller that they are taking steps to have it fitted to other vessels of their fleet. As further experience demonstrates the advantages and reliability of the system, we may expect that an invention which claims to have saved—as in the case of the *Cora Maria*—nearly 50% of fuel (even if that instance should prove to be exceptionally favorable) must sooner or later be widely adopted. The gain to commerce with such conditions will be so apparent to our readers that we need give no figures to illustrate it, and, after running nearly 12,000 miles of ocean journey without the least mishap, Mr. De Bay has fully removed the grounds for the fears expressed as to the weakness of his propeller.

ENDOWMENT OF SCIENTIFIC RESEARCH.—At the recent anniversary meeting of the Royal Astronomical Society of London, in addition to the ordinary business, a resolution was carried by a large majority to the effect that a 'general meeting should be held within two months, to take into consideration the question of the endowment of scientific research, and to express the feeling of the society on the subject.



CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds

San Francisco Mining District, Utah.

The Horn Silver Mine.

EDITORS PRESS:—This district was organized in 1871, but did not become prominent until the discovery of the great Horn Silver mine, in the fall of 1875. This town of Frisco, which contains a population of about 600, is situated at an average altitude of 6,100 ft., among rolling hills which to the west and south assume the dignity of mountains. The town is the present terminus of the Utah Southern R. R. Extension, a broad-gauged road owned by the stockholders in the Union Pacific and Utah Southern railroads and Horn Silver Mining Co. It has two emelters, a number of substantial business houses, one "gospel mill" and nearly 30 gin mills. The Southern hotel, a large and neatly furnished house, built of fire-proof sandstone, is a credit to the Territory. In its management the owner, Mr. J. J. Ferrell, is ably seconded by Capt. J. Pfeiffer, of Snake River placer mining fame. The *Southern Utah Times* is a newsy, wide-awake, 28-column weekly, edited by Mr. Charles S. King, and seems to be well patronized in this and surrounding camps. It is 242 miles by rail to Salt Lake City, and about 32 miles to the Nevada line. The climate is mild in the winter, snow rarely falling to a depth of over one ft., and about as warm in summer as at Rocklin or Sacramento. The one great drawback which Frisco has to combat is a scarcity of water, but it will at the same time offer an excuse for the existence of so many "sample rooms." All the water used by the populace comes in tank cars from Black Rock station 40 miles distant, and is then retailed at three cents per gallon. The price of this indispensable article was seven cents before the railroad brought it within easier reach. The general formation is quartzite and limestone, which is occasionally crossed by large porphyry dykes. I shall not attempt to even mention by name all the mines and locations in this extensive district, as their numbers are too great, but will confine myself to a few of the most prominent among them. First in the list comes Utah's big bouanza, the Horn Silver mine, which was discovered some six years ago by James Ryan and Samuel Hawkes, while working on what is known as the Grampian Hill. They sold their right, title and interest a few months afterward to Allen G. Campbell, Matthew Cullen, Dennis Ryan and A. Byram, for \$25,000, which is a better price than the discoverers of a genuine mine usually receive, but rather small as compared to the \$7,000,000 for which the last-named gentleman a few years later disposed of the same property to its present owners. It is, however, but fair to add that to Mr. Campbell and his associates belongs the credit of having opened up the mine and proving the vein to a depth of nearly 300 ft. They also erected smelting works in Frisco consisting of three stacks, refining works in Chicago, and included in the sale two mill sites and some valuable iron mines.

The original location embraces 1,440 ft. on the lode, 600 ft. wide, and the vein is traceable for two miles, with a general course of north 10° west. The Horn Silver mountain is sedimentary in formation, and has been once the scene of violent volcanic disturbances. Its strata consisted at one time of sandstones and limestones, lying horizontally, which were subsequently transformed into quartzites and marbles raised back from their original position by the volcanic agencies, and now dip to the westward at an angle of 20°. The formation here is limestone and trachyte, which form a contact where the lode occurs. The lode dips to the eastward at an angle of about 70° from the horizontal, and widens out with such a wonderful rapidity that while in one place it is scarcely a foot at the surface it has attained a width of 30 ft. at the same depth. In no place where work is so far being done has the ledge measured less than 28 ft. across, and its average width may safely be estimated at 60 ft., with not a sign of waste rock or wall fragment in the ore deposit. The foot wall consists of layers of quartzites and dolomites, while the hanging wall is a partially decomposed trachyte material.

The ore is divided into two classes, smelting and milling, the former predominating in all parts of the mine thus far open. The smelting ore, which is soft and earthy, consists of sulphate, oxide and carbonate of lead, all carrying silver. The milling ore is of three different classes, which may be designated as clay ore, spar ore and antimony combination. Very few traces of gold have been found in the mines.

The main working shaft is now down about 325 ft., and the company are at present sinking from the second level, which reached the ledge in 195 ft. On the third level it is about 100 ft. from the shaft to the hanging wall. Splendid hoisting works have been erected and railroad cars are loaded direct from the bins. The whole is under the able and efficient management of Major H. C. Hill, while Mr. George Hall superintends the mine.

The company are at present erecting new smelters in the neighborhood of Salt Lake City, to which the bulk of the ore taken from this mine will soon be shipped.

In my next letter I shall refer to some of the other mines in this district. A. L. M.

The National Balance Sheet.

The following is an official statement showing the financial and economic transactions of the United States of America for the four years ended March 1, 1881:

	March 1, 1878.	March 1, 1879.	March 1, 1880.	March 1, 1881.	Total.
Total receipts.....	\$265,839,831.85	\$297,038,817.04	\$298,749,742.85	\$360,580,175.41	\$1,223,207,566.15
Total disbursements.....	218,289,331.58	256,094,982.11	250,472,427.63	287,282,427.63	\$1,012,159,269.95
Total debt, less cash in the Treasury.....	2,042,697,120.08	2,020,207,641.66	1,905,112,221.17	1,570,556,412.77	\$6,538,567,405.68
Decrease of debt.....	46,744,013.06	14,829,687.42	31,045,380.49	76,816,588.42	\$168,015,679.39
Annual interest charge.....	92,637,283.50	101,615,647.50	130,211,033.00	176,083,252.50	\$400,547,116.50
Available in the Treasury, including redemption fund.....	72,920,913.88	144,635,043.00	160,331,700.30	176,083,252.50	\$453,970,909.68
Available in the Treasury, exclusive of redemption fund.....	12,768,565.96	38,205,559.52	62,076,111.57	83,108,925.08	\$196,160,162.13
Available in the Treasury, exclusive of redemption fund.....	30,999,399.00	36,211,600.83	62,076,111.57	83,108,925.08	\$196,160,162.13
Exports of live stock.....	209,762,809.00	326,762,690.00	374,636,312.00	915,271,163.00	\$1,826,432,974.00
Exports of other food.....	47,103,265.00	29,304,143.00	23,022,973.00	16,028,388.00	\$115,458,829.00
Exports of merchandise.....	47,103,265.00	29,304,143.00	23,022,973.00	16,028,388.00	\$115,458,829.00
Total exports—merchandise.....	94,206,530.00	58,608,336.00	55,045,946.00	32,056,771.00	\$239,917,183.00
Total imports—merchandise.....	25,200,000.00	56,990,250.00	92,714,283.00	88,570,187.00	\$263,475,710.00
Production of specie.....	1,488,423.00	911,212,265.00	5,073,831.00	5,701,252.00	\$7,175,771.00
Production of gold.....	300,000,000.00	421,000,000.00	222,000,000.00	264,000,000.00	\$1,207,000,000.00
Production of silver.....	300,000,000.00	421,000,000.00	222,000,000.00	264,000,000.00	\$1,207,000,000.00
Production of wheat.....	1,383,218,750.00	1,545,706,650.00	1,545,706,650.00	1,545,706,650.00	\$5,020,338,650.00
Production of corn.....	1,383,218,750.00	1,545,706,650.00	1,545,706,650.00	1,545,706,650.00	\$5,020,338,650.00
Production of pig-iron.....	1,383,218,750.00	1,545,706,650.00	1,545,706,650.00	1,545,706,650.00	\$5,020,338,650.00
Production of coal.....	54,308,590.00	52,130,534.00	65,303,208.00	69,200,534.00	\$241,442,866.00

NOTE.—The debt, less cash in the Treasury March 1, 1877, was \$2,088,781,143.04, and the annual interest charge, \$94,403,645.50; showing a decrease in the debt during the four years, as above, of \$208,824,730.27, and of the annual interest charge, \$17,557,708.

JOHN SHERMAN, Sec'y.

Treasury Department, March 1, 1881.

Treatment of Pyrites.

A discovery, which if successfully developed is likely to effect nothing short of a revolution in the pyrites trade of this country, has recently been made, and is presently seriously engaging the attention of chemists both in England and on the continent. Concerning it the *London Mining Journal* says: It has long been acknowledged by competent authorities that the method now followed for the assaying of pyrites was not the most satisfactory that could be wished; but the difficulty hitherto experienced in dealing with that ore was to extract the various metals (gold, silver and copper) in a manner that would yield a profit on the operation. This is the difficulty now said to have been overcome, and the discoverer of the process is a French scientist of standing. Of course, the practical results in dealing with large quantities of ore are yet to be ascertained, but the experiments up to this time made show a return of between 1 to 3 of an ounce of gold from each ton of pyrites treated. The right to the patent has been secured by the Tharsis Sulphur and Copper Co. (limited), and the apparatus necessary for the proper working of it out is being erected at the works of the company. The experiments hitherto made have been conducted in Paris, and there the results are regarded as of satisfactory character.

The company last year dealt with between 300,000 and 400,000 tons of pyrites, and the calculation is that the value of the gold extracted by the new process represents at least £3 per ton; off that sum, of course, there will fall to be deducted very heavy royalties.

FREIGHTS TO NEW MEXICO.—The rates of freight between Deming, N. M., to San Francisco and St. Louis having lately been the subject of newspaper correspondence, J. C. Stubbs, general freight agent of the Central Pacific railroad company, furnishes the following: The freight rates from San Francisco are as follows: To Tucson, from \$2.05 to \$3.50 per 100 lbs., according to the class; to Deming, from \$2.05 to \$4.50 per 100 lbs., according to class. From Los Angeles the rates are: To Tucson, from \$1.90 to \$2.75 per 100 lbs., according to class; to Deming, from \$1.90 to \$3.75 per 100 lbs., according to class. The rates from St. Louis are as follows: To Deming, from \$2.45 to \$5.35 per 100 lb., according to class; to Tucson, from \$4.02 to \$6.92 per 100 lb., according to class.

The Dull Spell at Globe.

A correspondent of the *Globe* (Arizona) *Chronicle*, gives the following "plain facts" to that paper, and the remarks will apply to other camps as well as that: I beg leave to make a few pertinent remarks and suggestions in regard to the present "dull spell" in Globe district, and state my ideas as to the best plan for restoring our late prosperity. The evident causes of our dull times are two-fold: First, most of our good mines have fallen into the hands of San Francisco and Eastern capitalists, who can afford to wait (and are calmly waiting) for opportunities to make quick and large fortunes by speculation, instead of developing their properties, or even attempting to do any actual or legitimate mining; second, a large majority of our "miners" who still own good claims in Globe district, are not attempting to make actual mining their legitimate vocation, but are simply trying to get their mines in the most attractive shape so as to sell as quickly as possible. Now, we do not question the right of both capitalists and miners to do as they please, but this mistaken policy is certainly pushing the camp down to a "bed-rock" condition. But there is no use in wraogling over the causes of this unfortunate state of affairs. I came to Globe to stay with it, but I "didn't come for my health!" I came with a small fortune, with a desire to increase it, but life is short, and I don't think it reasonable to wait till all the good mines elsewhere are worked out, before Globe district can get a chance. Now for the remedy: My proposition is simply to put our shoulders to the wheel jointly—miners, merchants and millmen—and push Globe ahead. I, for one, am willing to stake part of my means for the advancement of our common prosperity. Let there be one or more companies formed to work mines and take out bullion. Let miners, millmen and merchants be equally interested in the bullion produced. Let the miners furnish the mines and muscle, the merchants the grub and supplies, and the millmen work the ores. This is a feasible enterprise, as we yet have lots of mines not in the hands of speculators. We must show confidence in our own mines and work them, if we would have others believe in them. I sincerely hope that my suggestions will result in something practicable that will revive business at an early day in Globe city and district.

Mining Debris.

In the case of L. L. Robinson against the Black Diamond Coal Co., the Supreme Court has affirmed the ruling in favor of the defendant. The decision in this case has been awaited by many with a considerable degree of interest and anxiety, as the principles involved bore an affinity to those in the debris case. The facts of the case under consideration are briefly as follows: Robinson was the owner of a tract of land on the San Joaquin river, and the company had been mining for coal some three miles distant from this land, at an elevation of 700 to 800 ft. above Robinson's land, and had been so engaged for many years before the commencement of this action. Adjacent to the company's mine was Guercus creek, which extended from the mine, in a deep gulch, to the lowlands, where the watery cargo was discharged, Robinson's land being flooded thereby. According to the evidence in the case, the company deposited in the creek, at or near the mine, coal screenings, ashes and other substances, which during the rainy season were carried and distributed by the waters in the creek upon Robinson's land, and the value of the land was thereby greatly depreciated. In rendering its decision, the Supreme Court held that it would not be claimed that the company could convey and deposit refuse matter from its mine upon Robinson's land by means of carts, without incurring liability for any damage suffered by him by reason thereof, and the court knew of no principle upon which it could be held that a person may escape liability by doing that indirectly which would render him liable if done directly.

The Boss Bullion Shipment.

In answer to a query as to the large weekly yield of the Bonanza mines, the *Gold Hill News* says:

There were, during the years 1876 and 1877, several bullion shipments from the Bonanza mines which excited the wonder and admiration of the world. It would take time to look over the lists of these shipments for the largest amount turned out in any one week by a single mine. Your question can be answered, moreover, without it.

The biggest bullion shipment ever made at one time from the Comstock was by the Bonanza mines for the week ending Dec. 29, 1877. It was as follows:

Con. Virginia shipped at that date 133 bars of bullion weighing 16,668 lbs., and valued at \$540,196.05.

The California shipped 129 bars, weighing 16,130 lbs., and valued at \$559,903.66.

Summary—Dec. 29, 1877, bullion shipment from the Bonanza mines: 262 bars of bullion (16 tons, 818 lbs.), valued at \$1,099,099.71.

This was one shipment and made for that week, but really included eight days' run of the mills. It was loaded on flat-cars like pig iron and sent on the Virginia & Truckee railroad without any special guard.

The Paradise Mines.

According to reports from authentic sources, there is a mining revival in Mount Rose district, which is generally known as the Paradise mines. In the old claims which are being worked, extensive bodies of good ore have been developed, and in many of the new locations, or rather old claims which were neglected until quite recently, important developments are being made. When first discovered a few years ago, the Paradise mines created quite a stir among mining men. Unfortunately, the Paradise Valley, which was then considered the representative mine of the district, fell into bad hands, which, from bad management or some other cause, did not sustain its reputation. The surface ores of the mine were brought here by freight teams and shipped by rail to the Rye Patch mill, where they produced about \$175,000. Subsequently the company built a mill, and the proposition, based on the statements of the officers of the company, was that the mine was paying a handsome profit. Meantime, for some unknown cause, the stock depreciated to a few cents a share, so that the value of the mine and mill, according to the Stock Board quotations, was not over seven or eight thousand dollars. Work was suspended on the mine last fall, and it has remained idle ever since. This was a severe blow to the district, particularly as outsiders did not understand that the mine had not been prospected below the point where water was encountered. But the mine owners, who were aware of this fact, were not at all discouraged by the suspension of work on the Paradise Valley, but kept on at work, and now their perseverance is rewarded by rich strikes in almost every claim which is at all prospected. Experienced mining men say the geology of Mount Rose district is similar to that of the Comstock, and there is no longer any good reason to doubt the existence of extensive ore bodies in the mines. To-day there is more ore in sight in the district than ever before, and undoubtedly more work will be done there this summer than any previous time since its discovery.

American Trade with Mexico.

Tucson, which has been the market to supply the State of Sonora with all and every class of goods and merchandise will, of course, continue to do the same and on a much larger scale than heretofore, provided they will not kill the goose with the golden eggs. The principal complaint of all business in Mexico against American houses is that very mistake, and accounts for the strong hold of European houses all over Mexico, Central and South America. Various instances have occurred that Mexican merchants have gone to New York and made large purchases for cash, and after their return they saw by the next steamer the arrival of an agent sent by the very house from whom they had bought their goods, bringing with him another shipment of the same goods, with the intention to sell them and to compete with them before their own shop, selling the goods at auction or at whatever price they would fetch. This sort of proceedings of houses, which in New York are considered to be of first-class standing, is to say the least, against all ideas of common decency.

The only line of conduct of our merchants, if Tucson wishes to keep and increase the trade with Sonora, a trade which, after the completion of the railroad to Guaymas, might easily be extended down the coast to Mazatlan, San Blas, Acapulco, and Guadalupe, must be the strict observation of decency and honesty in their dealings with those customers, and if they will keep this before their eyes, we have not the slightest doubt that this city will, in another decade, be the large business center of this part of the United States.—*Arizona Mining Journal*.

LONGITUDE OF THE ASIATIC COAST OF THE PACIFIC.—It is understood that Lieutenant Commanders F. M. Green and C. H. Davis, Lieutenants S. M. Ackley and John Morris, and Surgeon Dale, U. S. N., now in San Francisco, have been detailed by the Navy Department to determine the correct longitude of the Asiatic coast of the Pacific ocean. They sail Saturday for China, to join the *Palos* on the Asiatic station. All points on the coast of Japan and China, connected by cable, will be visited, and their exact longitude determined. The American officers have permission from the cable companies to establish stations and use the wires at night. English officers are engaged in a similar work in New Zealand and Australia. The information obtained from the observations will be exchanged by the two nations. English officers have determined the longitude as far as Madras and Russian officers have made observations on the Siberian coast. All observations have been taken from the Hongkong observatory. The American party will ascertain the precise longitude of that place, there being a question as to the accuracy of the standard. The object of this movement by the Navy Department is to establish correct standards, from which true charts for the protection of maritime interests may be produced.

OSCEOLA.—A letter has been received here from Osceola in which the writer says: Times are very dull here at present, but I think there will be some very good mines on Weaver creek, and some say that they will pay \$20 a day with a good head of water. The bar prospects better than the creek claims.



## MECHANICAL PROGRESS.

## Foaming.

Foaming or priming means that the water in the boiler is in a state of violent agitation, rising and falling rapidly in the form of waves, or that the steam is mixed with water in the form of spray. Foaming is a source of great inconvenience, and not unfrequently of danger, on account of the uncertain and wrong indications of the water level given by the gauges; and as water is carried with the steam into the cylinders, it causes a serious loss of efficiency, and may cause a breaking down of the engines.

Foaming is made evident by the boiling up of the rapid and irregular oscillations of the water in the gauge glass, and by the sputtering sound produced as the mixture of steam and water issues from the gauge cocks. When the water is carried over into the cylinders its presence is made known by a clinking noise caused by the partial collapse of the piston rings, and, when the water is present in large quantities, by the thumping of the piston at each end of the stroke. All boilers are apt to foam when the water contains much mud or dirt of a mucilaginous nature. Soda, introduced into the boiler to neutralize the fatty acids contained in the feed water, often produces foaming. The various organic substances introduced into boilers to prevent the formation of scale are apt to produce the same effect.

The engines of the English naval vessel *Hecate* were broken down by excessive foaming, caused by the lime placed in her boilers to preserve them and not removed before getting up steam. When a vessel coming from the sea enters fresh water, or from a river enters the sea, the boilers foam frequently. In such cases it is advisable to change the water in the boiler as rapidly as possible by opening the surface blow valves wide and putting on strong speed.

The plan of stopping foaming by covering the surfaces of the water in the boiler with a layer of oil or molten tallow injected through the feed pumps is not to be recommended. It is not only an expensive remedy, but the decomposition of the animal or vegetable fats at high temperatures, and in contact with metals, produces fatty acids which are very destructive to boilers. Boilers are liable to foam when they have an insufficient and low steam room, a contracted water surface, and such an arrangement of the internal parts as to render the circulation of the water defective. It may be assumed that any boiler will foam more or less when its evaporation exceeds a certain limit, so that the steam bubbles rise so rapidly as to carry some of the water through which they pass along with them. For this reason, some water tube boilers are provided with deflecting plates at the upper end of the tubes, without which the water would be thrown in jets from the tubes into the steam space.

When the steam, as it is generated, has to escape in large masses through very narrow water passages, separate channels must be provided for the descending water currents, else the meeting of the two currents moving in opposite directions is very apt to result in foaming, or, sometimes, in lifting the water. The latter expression means that the steam does not rise as it is generated through the overlying mass of water, but accumulates on the heating surfaces so that water appears at a greater height in the boiler than would be the case if the steam and water occupied their natural positions.—*Ec.*

**A NEW STEAM PRESSURE REGULATOR.**—We learn from *Nature* that M. Weisnegg has lately constructed for M. d'Arsonval a new steam-pressure regulator which deserves notice. It fulfills, according to the inventor, the following conditions: 1. It maintains a perfectly constant pressure of steam in a boiler, whatever the actual output. 2. It maintains the consumption of fuel at a rate proportional to the output of steam. 3. It is absolutely automatic, and, therefore, prevents all risks of explosion. This regulator is of very simple construction. A leaden pipe from the boiler leads to a little apparatus somewhat resembling an ordinary lever safety-valve, but in which the valve-plug, instead of fitting into the usual conical seat, rests upon a thin disc of India rubber. This disc rises when the pressure from below exceeds the downward pressure from the plug and the superincumbent lever, and of the weight which it carries. It cannot get hot, as it is far from the boiler, and the space below the disc is filled with water condensed from the steam. The upper surface of the valve-plug regulates by its movement the flow of gas, which comes in and goes out by two pipes leading to the upper part of the regulator. One of these comes from the gas mains, the other goes out to the burners under the boiler. By this arrangement, whenever the pressure in the boiler reaches any desired maximum, the apparatus itself reduces the supply and turns down the flame, thus maintaining the pressure constant and the consumption proportional to the output of vapor. It will be seen that the invention is only applicable to the case where the fuel employed is gas. The apparatus is also in itself an automatic safety-valve, putting out the fire when the pressure exceeds the limit. M. Weisnegg has had practical experience during three years of the working of the new regulator, which appears to leave nothing to be desired in its performance. The same gentleman has constructed a constant-pressure air blast on the same principle.

## High-Speed Engines.

Within the last few years high-speed engines have gained a well-merited favor with rolling mill managers and others for economy and efficiency, and it appears to be only a question of time and of adaptation to circumstances when the field of the high-speed engine will be largely extended. One of the applications to which it will probably be put at an early date is the blowing engine. Attention is being more generally directed to greater economy in producing the blast for our furnaces and Bessemer works, and it seems likely that improvement will be sought in the direction of using a greater speed in the engines. The economy of high speed has been repeatedly demonstrated, and it is now generally recognized that, in connection with heavy reciprocating parts, it affords valuable advantages.

The *Iron Age* of March 10th gives an illustrated description of a high-speed engine recently built at the Hlewes & Philips Iron Works, Newark, N. J. A special feature of the engine is the form of the bed, which has been especially designed with a view of securing compactness and rigidity. The valves are given a quick opening movement, the steam passages are short and direct, and the exit of steam is effected with but little back pressure. The main bearing is also made one of the new features of the engine. The engine has a piston speed of 600 ft. per minute, the number of revolutions varying according to the size of the engine from 75 to 260.

**STEEL POLISHING.**—The following is taken from Holtzspffel: The polishers for razors and fine cutlery are soft leather wheels, charged with crocus, which are always used dry. It is necessary that both the polisher and the blade should be hot, as without a moderate and equal degree of heat, short, however, of that producing a color on the steel, the process does not succeed, a good polish is not produced. It is therefore usual with some workmen, before commencing work, to take a piece of razor steel which is held against the revolving polisher, to prepare it for the work itself, by crushing and regulating the powder with which the polisher is charged. A very moderate speed only is necessary for the polisher, but the razor is moved to and fro from end to end very quickly, and with considerable pressure, to distribute the heat equally. In examining the work the polished part is occasionally wiped clean with the "patch," a thick piece of cloth or felt, which is used both to protect the fingers from the heat of the blade and also to supply the polisher with crocus, as the patch is dabbed upon a small quantity of dry crocus close at hand, and then rubbed upon the polisher to transfer the powder to the wheel. If the polisher becomes hard on the surface, from being scorched, the wheel is stopped and the face of the polisher is roughed up or thoroughly scraped with an old razor blade or knife as in erasing writing, in order to remove all the old head or polishing stuff, and render the leather a little rough and quite soft; after which it is recharged by means of the thumb or patch.

**WIRE ROPE TRANSMISSION.**—Among the recent improvements in the way of transmitting power for long distances, is the substitution of belts by endless wire ropes running at a high speed. Just where the belt becomes too long for economy there the rope steps in. In place of a flat-faced pulley a narrow sheave, with a deep, flaring groove, is used, the groove being filled out, or lined rather with leather, oakum, India rubber, or some other soft substance, to save the rope. The essential points are a large sheave, running at a considerable velocity, and a light rope. When the distance exceeds 400 ft., a double-grooved wheel is used, and a second endless rope transmits the power 400 ft. further, and so on. The loss by friction is said to be only 8% per mile. If it is required to transmit 300 horse power by means of a wire rope, the size of rope required will be one inch in diameter, running 4,920 ft. per minute over a wheel 14½ ft. in diameter, making 108 revolutions per minute. One is thus enabled, at a small expense, to transmit power in any direction.

**THAT WONDERFUL LOCOMOTIVE**, built at Paterson, N. J., for an inventor, who, in his design, turned the ordinary locomotive topsy-turvy and imparted power to the driving wheels by friction, has been tried, and is said to have given remarkably good results in drawing heavy loads up grade, but it has not been tested for speed. On an up-grade of about 12½ ft. to the mile, the engine pulled 21 cars weighing over 474 tons with such an ease that more cars were added to the train in successive experiments, until finally 39 loaded cars, weighing 862 tons, were pulled over the same grade with from 135 lbs. to 140 lbs. of steam. In this engine the cylinder and the moving parts are above the boiler, so as to permit the use of double drivers, one set above the other, so proportioned as to give great speed to the driver, resting on the track, and to which power is imparted by friction.

**PROGRESSIVE INSTINCT(?)**—A singular circumstance is reported from a hot, dry valley in New South Wales. Last year the drouth there was of long duration, and the denizens of the apiaries suffered much from it. This year the bees have made provision against a similar emergency. They have filled a large number of the external cells in every hive with pure water instead of honey. It is thought that the instinct of the creatures leads them to anticipate a hot summer.

## SCIENTIFIC PROGRESS.

## Progress in Chemical Science.

It is very interesting and instructive to observe the steadily onward progress of science, and to note how, in the process of evolution, ideas and theories follow each other; each in turn ruling its particular department, accepted for the time as the perfect truth, yet to be superseded and apparently condemned. But the most interesting lesson to be derived from such a review is that *truth* never dies; it only changes its form. Scientific progress is not a series of revolutions, but a continuous evolution. This is, in fact, the fundamental distinction between true science and the pseudo-science of the paradoxists. With the latter each imaginary discoverer of the laws and secrets of nature is an independent prophet; his doctrine springs perfect from his own brain like Minerva from that of Jupiter. In true science each new discoverer of natural laws builds upon the foundations laid by that of his predecessors, and employs the material gathered by their labors. The superstructure may be altered in form, or even applied to new purposes, but the building is yet ours; the work of its successive architects remains.

In chemistry especially such apparent transformations imposed upon a true unity are very common, and the last 20 years have witnessed what appears to be an entire revolution in the chemical theories; but the changes are, after all, only modified and more complete expressions of old thoughts. During the last century, however, there has been a very complete and fundamental change in the science, yet that change, apparently entire, is destined to be but a step in progression; in the abandoned theories there was embodied a truth, and that truth, slowly growing like a germinating seed, is gradually penetrating the new theories, and combining together the old and the new into a more perfect unity.

For a century Stahl's theory of Phlogiston ruled chemistry. That theory asserted that combustion (and in consequence chemical combination generally) was due to an agent, or element, which united to matter, such as oxides, and so generated combustible substances; such substances, as we now know, being, in fact, simpler or elementary bodies; the act of combustion was the release of "phlogiston." Here we find fully exemplified that mixture of truth and error which is so commonly the result of the determination to explain facts, while the knowledge of the facts themselves is imperfect, and the processes occurring are unstudied. Phlogiston is but one of the long series of "fluids" invented by philosophers who would not wait, who thought that by covering up obscure facts in a word they could make that word explain the facts. We do the same still with the word which embodies the last of these fluids which survives, "electricity." Few recognize the certain fact that "electricity" is only a word, and a word which really only einhohiss facts and processes—not their cause.

Lavoisier made manifest the weak point of this theory by showing that combustion was a process involving absorption and increase of weight, and, therefore, could not be explained by a supposed loss of substance. This, followed by the discovery of oxygen and the development of the atomic theory, utterly banished phlogiston from the domain of science and left it a mere subject of ridicule. From that time chemistry became purely a material science, and devoted itself solely to the changes of position and union among the material particles or atoms, and working up through the successive theories of radicals, types, symbolic notations and molecular constructions, we have arrived at means of presenting to the imagination, and almost to the eye, a clear view of the infinitesimal arrangements of the elementary atoms which constitute the infinite variety of actual substances.

But, after all, valuable as these formulae and typical constructions really are, and important as is the part they play both in scientific advance and in the practical application of chemistry, yet they are to real chemistry, to the truth of nature, only what stuffed and dried specimens and articulated skeletons are to natural history. The life is absent, the causes operating are ignored.

The above is in part an introductory by J. T. Sprague, to his notice of the recent elaborate work of the great French chemist Berthelot, entitled "*Essai de Mécanique Chimique fondée sur la Thermo-Chimie*." This work consists of 1,340 pages, in two volumes, and is well calculated to give a great and new impetus to the study of chemistry. M. Berthelot says, in his closing summary: "The view of the chemical actions of substances, taken in their several conditions as gaseous, liquid, solid and in solution, has thus been presented in a general outline, and reduced to one single law of chemical statics. This law not only furnishes ideas both new and fruitful, both in theory and in practical application, but the very face of chemistry and the mode of its teachings are changed by it. "Such is the destiny of all human knowledge. No theory is final. The foundations of our knowledge undergo transformations, and the point of view is continually altered by an ever advancing process of evolution.

"The chemistry of types, of eeries, and of symbolic construction which has hitherto con-

stituted nearly the whole of the science, will hereafter be found, if not set aside (for no true science can thus disappear), at all events relegated to the second rank by the chemistry of the forces and their mechanics; this will control the former, because it will furnish the laws and the measures of its actions.

"The varied forms of matter, of which chemistry studies the diversity, are but parts of a common mechanism, the laws of which are the same when acting in the ultimate molecules of crystals, as those which control the visible parts of ordinary machines. From the mechanical (or physical) point of view, two fundamental ideas characterize the apparently infinite diversity of chemical substances, namely, the mass of the elementary particles—that is, their equivalent—and the nature of their motions. The knowledge of these two ought to explain everything. To this is due the present, and the yet greater future importance of thermo-chemistry, the science which measures the work of the forces operating in molecular actions."

**INCREASE OF RISK FROM LIGHTNING.**—The progress of civilization brings with it ever growing dangers. Herr Von Bezold inferred already in 1869, from observations taken in Bavaria, that there was an increase from year to year in the number of buildings struck by lightning. There seemed to be also an increase in the number of thunderstorms, and this was assigned as the cause. A little later, observations (by others) in Saxony and Schleswig-Holstein also showed an increase in the number of houses struck, but no comparison was made with the number of thunderstorms. Herr Holtz has lately made a fuller inquiry on the basis of data from all parts of Germany, and from Austria and Switzerland. In his brochure on the subject he publishes two tables, one to show the increase or decrease of thunderstorms since 1854, since 1862, and since 1870 in the different regions; the other the increase or decrease of lightning risk estimated from comparison of the number of lightning strokes on houses with the entire number of houses. It appears, then, that, while any increase in the number of thunderstorms is extremely small, and there is in some cases even a decrease, the lightning risk shows a very large increase, and in no case a decrease. Thus the increase of risks from lightning must be regarded as not due, unless in very slight measure, to meteorological influences. This appears more distinctly in that the increase of lightning risk is proportionally greater as the compared years are further apart; but it is not so with the increase of thunderstorms (which, *c. g.*, is less since 1854 than 1862). To explain the increased risk by telluric changes, Herr Holtz supposes the clearance of forest land has to do with it, perhaps, also, the increase of railways, both of these bringing thunderstorms more to towns and villages. Another probable cause is the increased use of metal in house construction.

**ANTARCTIC EXPLORATION.**—While the energy of modern explorers has greatly extended our knowledge of the geography of the North Polar regions, comparatively little has been done in the exploration of the corresponding portions of the southern hemisphere. Lieut. Wilkes, at the head of an American expedition, believed that he had established the existence of an Antarctic continent, and this discovery was verified a year later by Sir James Ross, who found the extensive Victoria Land with mountains 14,000 ft. high, and an active volcano. Beyond these discoveries, nothing is positively known of these extensive regions of the earth. It is now proposed by the Italian Geographical Society to send out an Antarctic exploring expedition under the command of Lieut. Beve, an Italian officer, who accompanied Prof. Nordenskjöld in his recent Polar voyage. The expedition of Lieut. Beve, it is given out, will be fitted out for a prolonged voyage, and it is announced to be the intention of the voyagers to winter in the Antarctic region for the purpose of making a thorough study of its character.

**THE PRACTICAL VALUE OF SCIENCE.**—I have endeavored to state the higher and more abstract arguments by which the study of physical science may be shown to be indispensable to the complete training of the human mind, but I do not wish it to be supposed that because I may be devoted to more or less abstract and unpractical pursuits I am insensible to the weight which ought to be attached to that which has been said to be the English conception of Paradise—namely, "getting on." Now the value of a knowledge of physical science as a means of getting on is indubitable. There are hardly any of our trades, except the merely huckstering ones, in which some knowledge of science may not be directly profitable to the pursuer of that occupation. An industry attains higher stages of its development as its process become more complicated and refined, and the sciences are dragged in, by one by one, to take their share in the fray.—*Huxley.*

**THE GAIN IN WEIGHT BY COMBUSTION** can be very prettily shown by the following method, which also affords a very good lecture experiment. A handful of fine zinc turnings is placed on the scale pan of a common balance, which should then be brought into equilibrium by placing weights on the other scale pan. Now apply a spirit lamp or Bunsen burner to the zinc, which, in its state of fine division, will readily inflame. As it is slowly converted to a cohesive mass of oxide, the scale pan will descend, showing that in burning it has gained in weight.



Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 17.	Week Ending Mar. 24.	Week Ending Mar. 31.	Week Ending Apr. 7.
Alpha.....	2.65	2.1	2.30	2.90
Alta.....	1.50	1.50	1.50	1.50
Andes.....	1.30	1.10	1.10	1.15
Albion.....	1.20	1.1	1.15	1.20
Argenta.....	1.50	1.50	1.50	1.50
Addenda.....	2.00	2.00	2.00	2.00
Belcher.....	1.60	1.15	1.15	1.20
Belmont.....	2.50	2.00	2.50	3.00
Best & Belcher.....	6.00	6.00	6.00	6.00
Bullion.....	6.00	6.00	6.00	6.00
Bested.....	6.00	6.00	6.00	6.00
Bested & Co.....	6.00	6.00	6.00	6.00
Bodie.....	6.00	6.00	6.00	6.00
Benton.....	6.00	6.00	6.00	6.00
Bulwer.....	6.00	6.00	6.00	6.00
Boston.....	6.00	6.00	6.00	6.00
Black Hawk.....	6.00	6.00	6.00	6.00
Belvidere.....	6.00	6.00	6.00	6.00
Booker.....	6.00	6.00	6.00	6.00
Calaveras.....	6.00	6.00	6.00	6.00
Challenger.....	6.00	6.00	6.00	6.00
Chollar.....	6.00	6.00	6.00	6.00
Confidence.....	6.00	6.00	6.00	6.00
Concordia.....	6.00	6.00	6.00	6.00
Concordia (Val.).....	6.00	6.00	6.00	6.00
Con Pacific.....	6.00	6.00	6.00	6.00
Derbec.....	6.00	6.00	6.00	6.00
Day.....	6.00	6.00	6.00	6.00
E. M. Diabolo.....	6.00	6.00	6.00	6.00
Eureka.....	6.00	6.00	6.00	6.00
Exchequer.....	6.00	6.00	6.00	6.00
Endowment.....	6.00	6.00	6.00	6.00
Grand Prize.....	6.00	6.00	6.00	6.00
Golden Gate.....	6.00	6.00	6.00	6.00
Goodshaw.....	6.00	6.00	6.00	6.00
Gould & Curry.....	6.00	6.00	6.00	6.00
Hale & Norcross.....	6.00	6.00	6.00	6.00
Head Center.....	6.00	6.00	6.00	6.00
Hussey.....	6.00	6.00	6.00	6.00
Independence.....	6.00	6.00	6.00	6.00
Julia.....	6.00	6.00	6.00	6.00
Judith.....	6.00	6.00	6.00	6.00
Jupiter.....	6.00	6.00	6.00	6.00
Kentuck.....	6.00	6.00	6.00	6.00
Kossuth.....	6.00	6.00	6.00	6.00
Lady Bryan.....	6.00	6.00	6.00	6.00
Lady Wash.....	6.00	6.00	6.00	6.00
Leads.....	6.00	6.00	6.00	6.00
May Belle.....	6.00	6.00	6.00	6.00
Modoc.....	6.00	6.00	6.00	6.00
Manhattan.....	6.00	6.00	6.00	6.00
Martin White.....	6.00	6.00	6.00	6.00
McClintock.....	6.00	6.00	6.00	6.00
Mono.....	6.00	6.00	6.00	6.00
Mexican.....	6.00	6.00	6.00	6.00
Mt. Diabolo.....	6.00	6.00	6.00	6.00
Morning Star.....	6.00	6.00	6.00	6.00
Monday.....	6.00	6.00	6.00	6.00
New York.....	6.00	6.00	6.00	6.00
Northern Belle.....	6.00	6.00	6.00	6.00
North Noonday.....	6.00	6.00	6.00	6.00
Navajo.....	6.00	6.00	6.00	6.00
Occidental.....	6.00	6.00	6.00	6.00
Ophir.....	6.00	6.00	6.00	6.00
Original Keystone.....	6.00	6.00	6.00	6.00
Overman.....	6.00	6.00	6.00	6.00
Oro.....	6.00	6.00	6.00	6.00
Paris.....	6.00	6.00	6.00	6.00
Potosi.....	6.00	6.00	6.00	6.00
Queen Bee.....	6.00	6.00	6.00	6.00
South Bulwer.....	6.00	6.00	6.00	6.00
Savannah.....	6.00	6.00	6.00	6.00
Seg Belcher.....	6.00	6.00	6.00	6.00
Sierra Nevada.....	6.00	6.00	6.00	6.00
Silver Hill.....	6.00	6.00	6.00	6.00
Silver King.....	6.00	6.00	6.00	6.00
Succor.....	6.00	6.00	6.00	6.00
Summit.....	6.00	6.00	6.00	6.00
Scorpion.....	6.00	6.00	6.00	6.00
Solid Silver.....	6.00	6.00	6.00	6.00
South Bodie.....	6.00	6.00	6.00	6.00
Standard.....	6.00	6.00	6.00	6.00
Syndicate.....	6.00	6.00	6.00	6.00
Tyza Con.....	6.00	6.00	6.00	6.00
Tip-top.....	6.00	6.00	6.00	6.00
Tuscarora.....	6.00	6.00	6.00	6.00
Union Con.....	6.00	6.00	6.00	6.00
Utah.....	6.00	6.00	6.00	6.00
Ward.....	6.00	6.00	6.00	6.00
Walden.....	6.00	6.00	6.00	6.00
Yellow Jacket.....	6.00	6.00	6.00	6.00

Sales at S. F. Stock Exchange.

Thursday A. M., Apr. 7.	280 Union.....	31
75 Alpha.....	169 Utah.....	72
150 Andes.....	100 Ward.....	23
1710 Alta.....	165 Yellow Jacket.....	3.40
370 B & Belcher.....		
1920 Belcher.....		
320 Bullion.....		
350 Benton.....		
440 Bodie.....		
435 Con Virginia.....		
645 Chollar.....		
400 Crown Point.....		
20 Confidence.....		
200 Con Imperial.....		
350 Caledonia.....		
155 Challenge.....		
350 Concordia (Val.).....		
750 Exchequer.....		
1230 Gould & Curry.....		
955 Hale & Norcross.....		
900 Julia.....		
500 Justice.....		
100 Lady Wash.....		
335 Mexican.....		
100 New York.....		
1130 Overman.....		
180 Ophir.....		
355 Potosi.....		
1820 Savana.....		
20 Seg Belcher.....		
255 Sierra Nevada.....		
230 Silver Hill.....		
430 Scorpion.....		

The Belmont mine and mill, Montana, handled 1,008 tons of ore in January at a cost of \$5.50 per ton, and the total yield was \$10,270. Last year 10 stamps were added to the mill, 2,000 ft. of tramway were built, \$25,000 were spent in the mine, and yet there was a profit over all expenses. Over 40,000 tons of ore are claimed to be in sight or obtainable.

CARRISLE DISTRICTIESOME 30 miles northeast of Victorio, New Mexico, and 5 miles north of the line of old Mexico. It was discovered in March, by J. G. Crittenden, who had selected specimens from the grounds years ago and had them assayed. The veins are continuous and compact and have every appearance of true fissures.

The managers of the Dayton smelting furnace are experimenting with El Dorado canyon coal, to ascertain whether coke can be profitably made from it for use in their works.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LITV'D.	DESLIN'G'T.	SALK.	SECRETARY.	PLACE OF BUSIN.	
Alta S M Co	Nevada	20	50	Mar 5	Apr 12	Mar 3	W H Watson	302 Montgomery
Andres S M Co	Nevada	16	25	Mar 1	Apr 7	Mar 1	B Burtis	309 Montgomery
Best & Belcher M Co	Nevada	20	50	Mar 17	Apr 20	May 10	W Willis	309 Montgomery
Belmont M Co	Nevada	28	10	Mar 8	Apr 19	May 17	J W Pew	310 Pine
Bullion M Co	Nevada	18	100	Feb 28	Apr 5	Apr 26	J M Brazell	328 Montgomery
East Noonday M Co	California	1	10	Feb 18	Mch 16	Apr 16	C V Hubbard	310 Pine
Caledonia S M Co	California	34	25	Mar 5	Apr 9	Apr 23	R Wegener	414 California
Confidence S M Co	Nevada	12	50	Feb 12	Mar 16	Apr 17	R Wegener	414 California
Crown Point G & S M Co	Nevada	45	50	Mar 23	Apr 29	May 25	Jas Newlands	327 Pine
Hale & Norcross M Co	Nevada	68	50	Mar 9	Apr 14	May 5	J F Lightner	309 Montgomery
Justice M Co	Nevada	24	25	Mar 28	Apr 3	Apr 21	E Kelley	413 California
Leviathan M Co	Nevada	12	25	Mar 23	Apr 26	May 17	F A Frisley	330 Pine
Leeds M Co	Utah	4	15	Feb 2	Mch 14	Apr 11	D B Chisholm	327 Pine
Mexican M Co	Nevada	15	50	Mar 16	Apr 21	May 11	C L McCoy	309 Montgomery
Northern Light M Co	California	7	15	Mar 2	Apr 27	F S Monroe		310 Pine
Overman M Co	Nevada	49	50	Mar 12	Apr 21	May 12	G D Edwards	414 California
Occidental Con G M Co	California	6	04	Feb 21	Apr 21	May 12	W T Smith	402 Montgomery
Ophir M Co	Nevada	39	100	Mar 9	Apr 14	May 4	C L McCoy	309 Montgomery
Savage M Co	Nevada	46	50	Apr 4	May 6	May 26	E B Holmes	309 Montgomery

OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

Amelia G M Co	California	1	10	Mar 14	Apr 22	May 17	J B Leighton	527 Clay st
Black Hawk G M Co	California	11	10	Mar 1	Apr 5	Apr 26	H A Charles	409 California st
Belvidere M Co	California	10	25	Feb 16	Mar 24	Apr 16	C V Hubbard	310 Pine st
Brooklyn Con M Co	California	1	05	Feb 21	Mar 28	Apr 16	J T McGeoghegan	313 Pine st
Dolan G & S M Co	California	1	05	Mar 23	Apr 3	May 16	J Morfio	328 Montgomery st
East Noonday M Co	California	6	15	Feb 18	Mar 16	Apr 16	J T McGeoghegan	313 California st
Golden Fleece G M Co	California	20	30	Mar 2	Apr 3	Apr 29	F R Schirmer	735 Folsom st
Golden Gate Con H M Co	California	4	50	Mar 25	May 3	May 25	J T McGeoghegan	313 Pine st
Grand Prize M Co	California	4	40	Mar 24	Apr 29	May 25	E M Hall	327 Pine st
Excelsior G M Co	California	15	25	Mar 9	Apr 6	Apr 26	D B Chisholm	327 Pine st
Elmstracht G M Co	California	6	05	Mar 12	Apr 19	Apr 23	H Knaz	209 Sanson st
Hagloe M & M Co	California	7	40	Feb 18	Mar 28	Apr 20	W Van Bokkelen	414 California st
Idaho Hill M Co	Idaho	3	30	Mar 17	Apr 25	May 17	R Wegener	414 California st
Franklin M Co	California	3	10	Mar 5	Apr 9	Apr 26	E J Friedlander	309 California st
Jupiter M Co	California	12	35	Mar 19	Apr 19	Apr 26	C J Montan	309 Montgomery st
Liquira G & S M Co	Nevada	1	25	Apr 5	May 5	May 13	A B Cooper	328 Montgomery st
Mayhelle Con M Co	California	7	10	Mar 9	Apr 14	May 9	W J Taylor	310 Pine st
Mono M Co	California	11	50	Mar 17	Apr 22	May 12	W H Lent	309 Montgomery st
McElroy Gravel M Co	California	5	10	Mar 6	Apr 13	May 3	L Lillie	607 Washington st
Mammoth M Co	California	2	25	Feb 9	Mar 14	Apr 14	A W Rose	330 Pine st
Martin White M Co	Nevada	9	25	Mar 19	Apr 28	May 24	J J Scoville	309 Montgomery st
Original Keystone M Co	Nevada	4	25	Mar 19	Apr 22	May 12	F E Luty	330 Pine st
Oakland G M Co	California	14	05	Feb 24	Mar 28	Apr 15	R D Hopkins	436 Montgomery st
Real Del Monte M Co	California	14	25	Jan 31	Mar 5	Mar 28	W C Hubbard	310 Pine st
Rocky Point M Co	California	7	10	Mar 13	Apr 14	May 16	W G Hughes	330 Pine st
Real Del Monte M Co	California	15	50	Mar 28	May 2	May 30	C Van Hubbard	310 Pine st
Syndicate M Co	California	3	25	Feb 15	Mar 21	Apr 12	J Stadelst	413 California st
South Hite M Co	California	1	25	Feb 15	Mar 21	Apr 16	F A Berlin	515 California st
San Pedro M Co	California	3	02	Feb 15	Mar 21	Apr 16	F G Holmes	509 California st
Tuscarora M & M Co	Nevada	8	15	Apr 2	May 9	May 30	M E Sperling	309 California st
Trojan M Co	Nevada	13	10	Mar 7	Apr 11	May 2	David Wilder	328 Montgomery st
Tilden M Co	Nevada	1	10	Mar 12	Apr 16	May 13	E C Masten	309 Montgomery st
Union Con M Co	Nevada	16	100	Mar 7	Apr 11	May 2	J M Buntington	309 California st
Utah Extension M Co	Nevada	1	10	Feb 24	Mar 26	Apr 15	W Ressayre	128 Sutter st
Wide Awake M Co	Arizona	12	10	Feb 17	Mar 25	Apr 16	C Hildebrandt	232 Sutter st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bulwer M Co	California	Wm Willis	309 Montgomery st	Annual	Apr 13
Confidence M Co	California	E T Allen	416 Market	Annual	Apr 18
Liquira G & S M Co	Nevada	A B Cooper	328 Montgomery st	Annual	Apr 18
Mount Potosi M Co	Nevada	E A Holmes	318 Pine st	Special	Apr 18
Republic M Co	California	Wm J Taylor	310 Pine st	Annual	Apr 19
Tioga Con M Co	California	Wm H Allen	309 Montgomery st	Annual	Apr 11
Wade M Co	Nevada	W H Allen	306 Pine st	Annual	Apr 18

LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Mar 21
Father De Smet M Co	Dakota	H Deane	New York	50	Mar 1
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	50	Mar 15
Silver King M Co	Arizona	J Nash	315 California st	25	Mar 15
Union Con M Co (2)	California	E Collins and Herman Bay	309 Montgomery st	25	Apr 15
Western M Co	California	O S Curtis	309 Montgomery st	75	Mar 2
Navajo M Co	Nevada	E M Hall	327 Pine st	25	Mar 25

Mining Share Market.

Although some people are expecting a "boom" very shortly in Comstock stocks, there are no special signs of it yet. We append the monthly statements of mines which show cash on hand and indebtedness. The following companies had cash on hand March 31st: Northern Belle, \$214,617.17; Standard Con., \$206,223.29; Western (Contention), \$68,431.43 in cash and \$77,500 in bullion; Silver King, \$72,950; Con. Virginia, \$18,847.38 in cash and \$10,784.30 in bullion; Bulwer Con., \$40,775.72; Chollar, \$29,378.43; Potosi, \$22,893.91; Gould & Curry, \$33,707.55; Crown Point, \$10,634.45; Utah, \$2,677.24; Silver Hill, \$2,143.61; North Bonanza, \$6,077.54; Flowery, \$432.94; Navajo, \$766.44; Occidental, \$8,560.67; Con. Imperial, \$2,140.21; Challenge, \$1,006.50; New York, \$65,366.16; Exchequer, \$6,894.17; Spaulding, \$658.72; Day, \$904.89; North Belle Isle, \$1,886.35; Julia, \$4,992.42. (The notes of the Julia company are still out for \$25,000 due the Ward company.) Bullion, \$20,342.29. (The Bullion company has an indebtedness of \$248,239.16, including \$235,000 due the Ward company.) Benton, \$16,184.04; Alta, \$17,419.94 in cash and \$52,322.37 to be collected from assessment No. 20.

The following companies had an indebtedness March 31st: Union Con. (overdraft) \$83,749.43; Overman, \$7,476.76; Caledonia, \$10,329.84. (The Caledonia has a balance of \$17,518.75 to be collected in assessments.) Lady Washington, \$5,406.65; Hale & Norcross, \$11,887.80; Sierra Nevada, \$4,654.25; Belmont, \$4,731.25; Equator, \$6,701.25; California, \$43,715.22; Ophir, \$5,294.14; Mexican, \$13,394.69; Metallic, \$7,974.47; Best & Belcher, \$7,497.24; Alpha, \$12,085.43; Grand Prize, \$15,327.64; Argenta, \$2,801.20; Independence, \$1,060.70.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Western, Mar. 26



14 ft wide of quartz, and assays from the croppings show \$11.10 in gold and \$5.30 in silver; total, \$16.40. Flat rock, both above and below the ledge, is even richer. Soil-dredge assay showing \$6.37 in gold and \$203.00 in silver; total, \$209.37. This rich float and the quartz of the croppings are identical in character. The new discovery is in Patterson district, which was organized some 2 years ago. One tunnel has been run in 150 ft and another 225 ft, but without finding the great *cata madre*.

**THE DISTRICT.**—*Free Press*, Mar. 29: The report that got about last week to the effect that a strike of extraordinary richness had been made in the Blackhawk was greatly exaggerated. The west crosscut from the bottom of the winze, 790 level, cut a 10-inch vein of very good ore at the edge of the shaft, that is all. Bodle Con. is drifting south on the Fortuna vein, from the bottom of the south winze from the 6th incline level (the deepest point yet reached in the mine), in very rich ore, which is of great importance as going to show that the vein grows even richer as it descends. Jupiter also appears to be making an important development in the south drift from east crosscut No. 2, 600 level, giving assays well up in the hundreds. Concordia shows continued improvement in the north drift on the large east vein, and the south drift on the west vein is still giving high assays. Con. Pacific is making a fine showing by its north drift in Pacific level No. 2, 600 level. Standards west crosscut on the 1000 level is still in favorable ground, and all the stopes in the mine are looking well. Toga is still driving the east crosscut, 982 level, and now in ground indicating the proximity of an ore vein. The north drift, 300 level, of Boston Con., shows the ore vein on that level to be increasing in width and holding its good grade. Syndicate is stopping and milling ore and shipping bullion. Sinking has been temporarily suspended in South crosscut, and the new drift is being made for the new hoisting engine, which is daily expected. Goodshaw is still sinking, and the Lent and Red Cloud shafts are being steadily pushed downward. Adenda is making some repairs in the shaft, where the ground is swollen somewhat, and will soon resume drifting to the northward. The north drift in the Stonevale ledge, 400 level, of Bulwer Con., is in 2 ft of ore. The standard's new and powerful hoisting engine is being put in position, and will be ready for work within 2 or 3 weeks. Work on the foundations for the powerful pumping machinery at the Lent shaft is progressing rapidly, all the machinery being now on the ground. The Noonday mill will start up again this (Tuesday) morning, with a new 350-horse power Harris Corliss engine and 10 additional stamps, making 40 in all—the largest mill in this section of the country. Pipe has been laid, and water for both mill and mine will be drawn from the Red Cloud shaft. Both of the Noonday mines are looking well.

## NEVADA.

**LIBERTY HILL W. & M. COMPANY'S CLAIMS.**—*Nevada City Transcript*, April 2: Mr. S. Wheeler, Superintendent of the Liberty Hill Consolidated and water company's mines, at Liberty Hill and Liberty Hill, left for New York Sunday, being accompanied by his wife. It is reported that negotiations are pending for a sale of the entire property of this company to a New York company, and the sale will be made as soon as the patent has been obtained. W. D. Apple has a force of 7 men employed working through a portion of the above company's ground, on shares, in order to reach his own claim, which has no outlet at present.

**PROSPECTING FOR RICH ROCK.**—*Grass Valley Union*, April 3: The Rocky Bar company is sinking a prospecting shaft near the western boundary of the claim, where it adjoins the McDonald & Mullen ground, to determine if any of that rich bonanza rock is to be found on their side of the line. A prospecting drift from the main shaft has been run in that direction, which will be opened upon the new shaft, and give good ventilation and a better chance to prospect the ground. About a year ago the Rocky Bar had very rich quartz in this portion of the ground, and it is thought there is more of the same kind to be found upon extending the explorations. The prospecting shaft is now down 90 ft, and will have to be sunk to the depth of 130 or 140 ft.

**DEERES MINE.**—*Transcript*, April 1: It is reported that another shaft to be sunk in the rich deposits was struck Sunday in the south drift of the Derby. The north drift continues to look well, and considerable gravel is being hoisted. The framework of the hoisting works over the new shaft is nearly completed, and the machinery will be taken up as soon as the shaft is in a fit condition.

**TRUE BLUE MINE.**—The hoisting and pumping machinery formerly used on the Nevada claim, near Sugar Loaf, in the district, has been removed to the True Blue shaft mine, in Little York township, near Mount Gro, and the work of putting it up there began yesterday morning. It will probably be in place and ready to start up within 2 weeks. The new incline of the True Blue was sunk 75 ft before water came in, requiring pumps. It will be put down about 300 ft before drifting is commenced. The prospects are flattering for a rich drift mine being opened there.

**ROUND MOUNTAIN.**—The owners of the Round Mountain drift claim have concluded to push their main tunnel into the bill a distance of 400 ft beyond the head of it at present. It is now in about 900 ft.

**THE PITTSBURGH MINE AND TUNNEL.**—*Grass Valley Union*, April 3: The drain tunnel, which is being driven under Gold Flat to the Pittsburgh mine, has reached a distance of 400 ft. The tunnel is now being driven on a level which it will strike at the 300 level. At the present rate of progress the tunnel will be completed by the 1st of June, when all the surface water from the mine will be drawn off, and the pumps started to drain the lower levels, which will soon be accomplished, as the bottom of the mine makes but little water.

**STRIKE AT THE BANNER MINE.**—*Transcript*, Mar. 30: A labor strike has been declared at the Banner mine, in the incline, at the Banner mine, disclosed a clearly-defined 3-ft ledge of sulphurated ore almost exactly similar to that worked in the old mine, and by milling assays found to be worth \$17 a ton. If the present highly favorable indications continue for 2 or 3 weeks more—and the case can hardly be otherwise—Supt. Brown will have a 10-stamp mill erected there as soon as it can be put up.

The Banner mine is taking men are taking some rich ore a short distance north of the Banner location, and various other parties are prospecting in the vicinity.

## PLACER.

**UPPER DIVIDE.**—*Placer Herald*, April 2: The mines here are running well and steadily. The Vein Emon mine, as usual, is paying well. They still pay the highest wages paid miners in this State. They claim that 15 good, experienced, well-trained hands will do as much as 25 in different hands, and will use less tools and require less supervision. The Wesko mine is employing about 25 men, and the mine is paying satisfactory dividends. It is under the supervision of Thos. E. Muir, a practical and experienced miner. The Baker Drive mine is now running in good shape, with a strong force of men.

**TUNNEL.**—Some time ago a survey was made from the ravine below the Masonic hall, to ascertain if a tunnel could be run from there low enough to tap the Wesko channel; a good site for a tunnel and outside works was found, and the feasibility of the undertaking demonstrated. The tunnel is now being commenced, and, judging from its dimensions, it will be a heavy undertaking. The size of the tunnel will be eight ft high and 10 ft wide, with a double track. Through the energy and perseverance of Mr. Muir, San Francisco capital has been enlisted in this enterprise, and he has the general supervision of the work. A tunnel 3,000 ft long will tap the channel and drain the divide for several miles. Barfield drills will be used, and a large over-shot water wheel will be used to run the tunnel, which will be run by compressed air also.

**THE DANIEL WEBSTER** is still showing well, and the owners are very busy with teams getting lumber and timber on the ground for the necessary buildings and works. The "Root Hog" Co., at Last Chance, has completed its new tunnel, and is now running. T. T. Darling's mine, at Deadwood, is paying handsomely, with every prospect of a long continuance of the pay dividend. Brickford & Co., of Deadwood, are taking out good pay. This is a new mine just opened, and bids fair to become a first-

class drift mine. Ray & Highland, at Last Chance, are still taking out large quantities of gold. They have a permanent paying mine. The same is true of the Sharp Stick mine, owned by Trull & Co., and adjoining the Ray & Highland mine.

## PLUMAS.

**ARCADIAN.**—*Greenville Bulletin*, April 2: A contract has been let to run 970 ft of tunnel, which will open out the mine at a great depth.

**GOLD STRIP.**—Supt. Standart reports work going ahead as usual at the mine. Twenty-four stamps are running on good pay rock, and there is no interruption of the prosperous activity which has so long characterized this excellent property.

**ATLANTA.**—This mill 10 stamps are running, and most of the miners are at work in the lower tunnel, and engaged in a general prospecting and development of the entire mine.

**SOUTHERN EUROPEA CO.**—The mill is running steadily and the quality of ore is very superior. Work in the middle tunnel is progressing, the lode constantly improving in width and appearance. The drift is now 20 ft in width, and in richness far surpasses the most sanguine expectations which had been entertained concerning it.

**PLUMAS NATIONAL.**—The mine is improving as the developments progress. The west chute is increasing in size and richness as the stopes are extended. Mr. Charles H. Aaron, who has been regulating the chlorination works, has them now in splendid working order, and the process of desulphurizing, chlorinating and precipitating is running smoothly. As an evidence of the perfect character of these works, the amount obtained is within 35 cents per ton of the assay value of the ore. There is scarcely a quartz vein in Plumas county but what contains sulphurates in paying quantities.

**THE BUSHMAN CLAIM.**—*Plumas National*, Mar. 23: The other day, while over in the Black Hawk region, we called on Messrs. Brown & Brummingham, the gentlemen who have leased the Bushman claim. They are taking out pay gravel, and are at work in a fine gravel channel as can be seen in the State. The miners take out the dirt through an inclined tunnel, the water being pumped and the dirt raised by the power of an overshot wheel.

**ANOTHER NUGGET.**—For years and years the fame of the big chunks of French ravine has been sounded by the East Branch miners, and the old gold has been worked over and over in search of them, but it seems that "the ore is not yet." A short time ago a Spaniard, who is known on the river as "Old Kosuth," succeeded in finding a piece of quartz and gold which was worth over \$300 French ravine is the spot on which is located the quartz ledge owned by Mr. F. B. Whiting, of this place, and several of the East Branch miners.

**THE GEM MINE.**—On Wednesday we paid a visit to the claims of Lee, Smith, Payne and Garrett, near the head of Buttery valley. The boys are doing a good business this spring, and with the aid of their little hydraulic outfit they have stripped quite a large piece of ground. The dirt is some 14 ft in depth, and carries some gold from the top down, but most of the pay is on the bedrock. They have not "bottomed out" much, as yet, but from some past prospects which we saw, in the gravel, it is safe to say that they will do a good summer's business. The gravel prospects at the rate of 12 or 15 cents to the pan, and the dirt, which is a short time ago a Spaniard, who is known on the river as "Old Kosuth," succeeded in finding a piece of quartz and gold which was worth over \$300 French ravine is the spot on which is located the quartz ledge owned by Mr. F. B. Whiting, of this place, and several of the East Branch miners.

**MORE RICHNESS.**—The old Western gravel claim, under R. Z. Bell's management, at Newtown, is showing up well. Work is being energetically pushed, and with success.

## SAN BERNARDINO.

**CLAIMANTS.**—*Colton Semi-Tropic*, April 2: There seems to be quite a number of claimants to the rich Waterman mine on the Mojave, now it has proven to be a good thing. The claimants are interested in showing Mr. Waterman the location of the mine, and Warren Wilson claims the whole thing under an old location made by his father, now deceased. Wilson claims the time of his father's location had not yet run out.

**EXCITEMENT.**—There seems to be no abatement in mining excitement in our county. The Mojave, Grod, Providence Mountain, Dry Lake, Ivanpah, Resting Spring, Salt Wells, Pinto, and all the other mining camps prove lively places and new discoveries every day.

**CONTRACT.**—A contract has been let by the Slover Mountain M. Co. for the sinking of a shaft 50 ft deep on their mine. The prospects become more and more favorable as the mine is more fully developed.

## SIERRA.

**COMPLETED.**—*Mountain Messenger*, April 2: The tunnel of the B. M. Ex. Co. is now in 3,400 ft, the last 1,000 ft having been completed on Wednesday. The tunnel is still all in gravel and some 5 or 6 ft above the bedrock. The strata lie about level. The gravel is all quartz and is pronounced first-class looking for top gravel by experts.

**THE CHICKEN.**—The Chickens, which makes the flat, commenced work again about the 1st of March. They succeeded in getting nearly all the water out of the shaft when, through an accident, they lost a pump, and have just succeeded in getting the mine clear again.

**JAKE WINANS** is running his hydraulic claims near his ranch below Dan Cole's. The gravel looks well.

## TRINITY.

**WATER.**—*Trinity Journal*, April 2: Hydraulic mines are running with a fair supply of water, considering the season. To this mine more than an average quantity of ground has been washed by the mine in this county. We expect to soon hear of some large clean-ups.

## TUOLUMNE.

**CHIEF.**—*Tuolumne Independent*, April 2: About two weeks ago a chipsa weighing 4 lbs was taken out of the Phoenix placer mine, a short distance east of Sonora, by John Rosasco & Co. while doing sluicing. The mine was lately owned by Si Reed, who sold it to the above parties. It is estimated that there is only 1 lb of quartz in the piece, leaving about 3 lbs of pure gold, and worth over \$600. The piece looks as if a part had been broken off.

## NEVADA.

### WASHOE DISTRICT.

**SIERRA NEVADA.**—*Virginia City Enterprise*, April 3: On the 2300 level the raise is completed and the station on the 1700 level finished. On the 2400 level cleaning out and repairing the north lateral drift. During the week 253 tons of ore were extracted. Bullion to the value of \$50,607.35 was shipped last evening.

**CALIFORNIA.**—During the past week 447 tons of ore, assaying \$21.75 per ton, have been extracted and sent to the mills. At the C. & C. shaft we are cutting out a bob station at the 2100 level. Bullion shipped last evening, \$23,483.50.

**CO. VIRGINIA.**—During the past week 306 tons of ore, assaying \$20.35 per ton, have been extracted and sent to the mills. At the 2500 level the joint California west drift to the C. & C. shaft has been extended 31 ft. Bullion shipped last evening, \$28,984.30.

**UNION.**—The shaft has been sunk and timbered 10 ft. Are repairing the shaft at the 2200 and 2500 stations.

**C. & C.**—The shaft has been sunk and timbered 24 ft below the 2500 level. A bob station is being cut out at the 2100 level.

**ORIGINAL KEYSTONE.**—The shaft is down 400 ft. The rock is becoming softer and shows seams of quartz. The water is handled without trouble.

**UNION CON.**—On the 2500 level the joint Mexican east crosscut has been extended 34 ft, the joint Sierra Nevada winze has been sunk and timbered 15 ft.

**MEXICAN.**—On the 2500 level the joint Union Con. east crosscut has been extended 30 ft, and the joint Gphir east winze has been sunk and timbered 16 ft.

**UTAH.**—During the past week the incline has been sunk and timbered 10 ft. The ground in the bottom is becoming somewhat harder. The south drift on the 2150 level has been advanced 10 ft.

**ORZIR.**—On the 2500 level the joint California east crosscut has been extended 33 ft, and the joint Mexican east

winze has been sunk and timbered 16 ft. Are repairing the main shaft, near the surface.

**ALTA.**—During the past week we have sunk and timbered the shaft 5 ft; total depth, 1,890 ft. We stopped sinking last Monday morning, and commenced excavating for a tank station at the 1850 level, and preparing the 1050 bob station to receive the bobs, all of which work will be completed during the coming week, when sinking will be resumed.

## CANDELARIA DISTRICT.

**NORTHERN BELLE.**—*True Finsure*, Mar. 20: The crosscut from the 4th level drift has been driven a distance of 21 ft, and the formation shows more favorably. The other shaft levels took fully as well a week ago. In the section of the mine above the adit level, the work has been attended with good results. The daily product of ore is about 55 tons. Both mills are running steadily and doing their usual good work. The bullion shipments for the week ending March 23d amount to \$24,551.25; and shipments on March account to \$73,757.11.

**MOUNT DIABLO.**—This showing here is very good for first-class ore, and the prospect is as good as it is ever been. The mine is being worked on the 1st level, and the north crosscut on the third level has advanced 14 ft, and is in favorable ground with a showing of low grade ore. The north crosscut on the second level shows a good streak of \$30 ore in a westerly drift.

## ESMERALDA DISTRICT.

**A MILL.**—*Esmeralda Herald*, April 2: For some time W. H. H. Buckley has been straining every nerve to accomplish an object so much needed in our camp, i. e., the interesting of capital in our mines. His efforts have at last been crowned with better success than the most sanguine ever dared to hope. The company interested have secured the Cortez and Seminoles mines, and on Monday morning Supt. Buckley will start as many men at work as can be advantageously crowded into the mines. A tunnel will be run from Cottonwood gulch to tap the Cortez and Seminoles, which will strike the ledge in the former at a depth of 150 ft, and the latter at 400. Ore will be extracted from the incline already run in the Cortez, so that when the 10-stamp mill, which the company will put up immediately, is finished there will be a supply of ore on hand. The plans and specifications have been accepted, the lumber and machinery ordered, and work will be commenced on the foundation for the mill just as soon as the frost gets out of the ground, which will be in one to three weeks—owing to the weather. The mill is to be erected on the old Napa mill site, half a mile below town. Part of the machinery comes from New York and part from San Francisco. The company mean business, and are going to work in earnest and in the right way.

## GRANTSVILLE DISTRICT.

**ALEXANDER.**—*Cor. Bonanza*, Mar. 20: Since my last report we have advanced 10 ft in Alexander incline. Ore rapidly improving in value, and changing from zinc glance to antimonial, and the look of the ore is better. The great stopes in No. 5 east show bigger every day. Almost perpendicularly under this an upraise from No. 6 has developed a solid mass of sulphur. The new boiler is in place, and works to our entire satisfaction.

**BROOKLYN.**—In the Brooklyn incline we have advanced 11 ft during the past week, the formation indicating that we are not far from the ore. In south crosscut No. 2 we have reached the same body of ore that we have above, between levels, showing, however, a great improvement in grade as it steadily changes from zinc glance to antimonial.

## LEWIS DISTRICT.

**COAL MINES.**—*Reville*, April 1: A lot of coal from one of the veins of this mine, near Lewis, was taken to Austin to be tested, and was burned in one of the Manhattan offices. It made a splendid fire, and the ashes are to be weighed for the purpose of ascertaining the percentage of waste in the coal. A good mine anywhere near the railroad would be a very valuable piece of property.

## MOUNT GRANT DISTRICT.

**MILL AT MOUNT GRANT.**—*Esmeralda Herald*: S. L. Hanek has made the necessary arrangements, had the papers signed, sealed and delivered, and is now on his way to Virginia city to get a mill for the Big Inge M. & M. Co. at Mt. Grant. He informs us that it is his intention to have the stamps rattling in 60 to 90 days on the richest first-class quartz in the State. At the end of this summer, says Mr. Hanek, "we will be able to take 500 men to work in Mt. Grant district, and thousands of dollars in bullion going out every day. The Big Inge is well named; she's a daisy." Mt. Grant district is 7 miles from Hawthorne, on Squaw creek. There is abundance of wood and water for mining and milling purposes, and good sites for mills. Most of the veins are small but very rich.

## MOUNT ROSE DISTRICT.

**PROMISING.**—*Silver State*, Mar. 20: If Dame Rumor can be relied upon, the mines of Mount Rose district are giving better signs of promise than for a year past. All are hopeful, and a great many are very sanguine that the mines will soon develop a brilliant product of metallic wealth.

## SIERRA DISTRICT.

**THE GEM MINE.**—*Silver State*, April 2: A force of miners is now at work on the Gem mine, which is situated about 20 miles south of town, in the East range. We are informed that the mine is producing considerable rich ore, 2 tons of which were recently shipped to San Francisco to be reduced. Years ago, the Gem produced considerable ore which worked from \$400 to \$600 per ton, in the Pioneer mill, at Unionville. The ore is principally chlorite and horn silver, specimens of the latter assaying as high as \$13,000 to the ton. The vein is generally small, but rich, and is crossed by the Gem mine, which makes the mine a very valuable one. Although Sierra district, in which it is situated, is noted for its gold mines, the Gem ore scarcely carries a trace of that metal.

## ARIZONA.

**CAYE CREEK.**—*Cor. Exposition*, April 1: Panther No. 2 is the best mine in the district at the depth of 50 ft. Mr. Hickles has gone to work on Philes' mines, opening the different claims. Philes has struck rich ore in the Gageon. Philes 30 ounces silver, 315 gold, and 452 lead. Bully for Philes, who they say is a rustler, and deserves all he will get.

**CENTENNIAL.**—At the Centennial, work has been going ahead steadily under the efficient management of Supt. A. S. Blake. Within the past 21 months they have sunk incline shaft No. 1 to a depth of 93 ft, and 323 ft of drifts have been run. A continuous body of ore has been developed in the shaft, and in the drifts the ore is continuous for at least four-fifths of the distance drilled.

**GUR MILLS** are doing good work at present. The Mack Morris is running steadily and making regular shipments of bullion. The Globe is reducing an average of 7 tons of Alice ore per day—the bullion shipments averaging about 3 bars per week. The Stonewall Jackson is also doing steady work on the rich ore body found in the lower level.

**WORK** was suspended at the California mine about 10 days ago, but will be resumed this week, and it is expected that some important developments will soon follow.

**A MEXICAN** was in town last Sunday exhibiting a nugget of gold weighing 10 ounces, for which he was offered \$80. It was found in the placers of Lost gulch, about 2 miles west of the Golden Eagle mine. He says that one can easily make \$5 a day in that locality by using a common sluice box.

**MR. W. B. HELLINGS** is pushing work on the South Placer mine, in Mineral Creek district, with a full force of men. He proposes to ship his ore to San Francisco, which is *prima facie* evidence of its high grade.

## IDAHO.

**A MILL WANTED.**—*Yankee Fork Herald*, Mar. 26: A brief interview with some of the leading millwrights on the Yankee Fork led to a further interview with one of the leading saw mill firms on the river, we are permitted to make public the offer of the above parties respecting the constructing of a 10-stamp custom mill, with chloridizing

roasters attached, to be built at any convenient point on or off the Yankee Fork in the Yankee Fork mining district. The proposition above referred to is that the saw mill firm will cut and furnish all the lumber and timber needed in the construction of the mill at the lowest market rates, and take the pay in stock of the mill when the same is completed. The millwrights offer to do all the work of putting the mill in perfect running order from the foundation up, and take their pay for their labor in stock of the mill.

## MONTANA.

**ALICE.**—*Butte Miner*, Mar. 29: The ore bodies in all the levels of the Alice are looking fine and are worked vigorously with a daily output from the mine of over 80 tons. The immense ore bodies explored and in reserve can hardly be described in a brief report. Sinking the winze from the 500 to the 700 level goes on, with first-class ore coming out of all the stopes and levels.

**NARAGANETT.**—The Naraganett mine has been heretofore opened and developed to a considerable extent and some very good ore has been found in it.

**NARROW GAUGE.**—The Narrow Gauge mine is located about 3 miles west of the Gagnon, and is a property that has been developed considerably. The mine is owned by John Strocher and August Mills and is looking quite favorable just now. A main shaft has been sunk to a depth of 120 ft. The mine is in a granite formation.

**SILVERSMITH ARMY.**—The Silversmith-Army mine has been incorporated, under the new corporation work is to be commenced on the mine soon.

**LEXINGTON.**—An excellent quality of ore is hoisted daily from the shaft. The quality averages up, and some of it is very rich. Sinking operations are about to be resumed at the 600-ft shaft of the Lexington. This shaft had reached, last fall, a depth of 130 ft when work was stopped, awaiting the erection of steam hoisting and pumping machinery.

**MOULTON.**—Everything is busy at the Moulton mine. The dropping of the 3-compartment shaft is somewhat slower than heretofore, as the rock is harder. The shaft has now reached a depth of 280 ft. There is no sign of water yet. The double cylinder hoisting engines are in position. The foundation is ready to receive the 3 75-horse power water-tube boilers. Four Ingersoll drills arrived a few days ago. These drills are the largest ever brought to Montana.

**MOORE.**—Work of sinking is now going on, with a vein of about 2 ft of good ore at the bottom of the shaft.

**VALLEY.**—On the Valley mine, Upson & Co. have put down a shaft well 75 ft. The ore vein is 6 ft wide. Level running is going on from the main shaft.

**SUNNYSIDE.**—The main shaft on the Sunnyside mine is down over 100 ft. Two ft of ore in the bottom assays 30 ounces in silver to the ton.

**PHILIPSBURG.**—*New Northwest*, Mar. 20: Successful development continues to be made on the Grants Mountain mine. The 120-ft shaft, and the tunnel run on the lode 70 ft beyond the shaft. The vein is 7 ft wide.

**TUS ALGONQUIN** is in the crosscut 35 ft, and will soon be stopping out ore again.

**A NEW ROAD** has just been finished up Frost gulch to the Cliff mine and the ore from this mine will be running through the Hope mill in a day or two.

**ANOTHER 40 MEN** are working in the Trout mine.

**THIRRA** have been about 75 men lately discharged from the Salmon and Emma mines and Algonquin mills, causing a depression in the labor market.

## NEW MEXICO.

**NOGAL.**—*Gazette*, Mar. 29: A new strike has been made in the Nogal district. This is known to be one of the richest mines in the Territory. The main lead has been lost in sinking the shaft on account of the bending of the lead, and the workmen were at a loss to know what to do. When Prof. Robertson was at the camp a week or so since he ordered the shaft to be cut further down the hill. This was done, and the result has been to strike the original lead. It is clearly defined and 4½ ft wide. This mine is to the Nogals what the Homestake is to the White Oaks.

**CIMARRON.**—Mr. Frank Hoxie, of the Cimarron M. Co., was in town yesterday. He reports that the machinery of the Cimarron is being worked, and will be rapidly put in shape under the direction of Capt. Fletcher.

**NOTES.**—*Arizona Journal*, Mar. 31: Dr. Fox, formerly a prominent citizen of St. Louis, but more recently from California, reached Tucson yesterday from a trip through New Mexico. He says the mining prospects in the vicinity of Silver City are good, but there is little development save on the Brannen mine, which is being steadily worked. He is turning out some very fine ore. Dr. Fox has been working this mine successfully for some years. A provoking incident happened in connection with this mine the other day which illustrates the absurdity of implicit reliance on expert testimony. Parties in St. Louis were anxious to buy the mine and sent out an expert to make an examination. The scientist, upon his return, reported against the property, and the sale was defeated.

## OREGON.

**PROSPECTING.**—*Bedrock Democrat*, Mar. 30: Several parties are getting their equipments ready for prospecting our hills in search of mineral deposits. No section of mineral country on the coast presents a better field for the prospector to commence operations and be duly rewarded. Enough rich discoveries have already been made to show conclusively that rich deposits of quartz exist in the hills all around us, and in the gulches, placer claims of immense wealth.

**THE CALIFORNIA.**—*Democratic Times*, April 1: A correspondent sends us the following news from Josephine: The California gold and silver mining company will soon commence operations in order to get their claim in running order for next season. They have excellent ground, which they intend to work with a large-sized giant as soon as their ditch is completed. Deselles & Co., at Scotch gulch, have finished piping for the season, and are getting ready to work their elevator. If error of Butler gulch, is running steadily with a few more men, will continue ground-slucing for a month or longer. Wimer & Simmons are piping night and day, and have made a grand showing in the line of moving ground with their little canal and big giant.

**NOTES.**—Cleaning up is becoming general. More rain would be greatly beneficial. The mining season is beginning to obb. S. W. Lackland has sold his interest in the Palmer Creek diggings to Chin Lin for \$1,500. The warm weather is melting the snow in the mountains, keeping up the supply of water in the big ditches. A. Kester informs us that a piece worth \$45 was recently picked up in Gold-worth & Co.'s claim on Foot's creek. A promising quartz ledge has been found near Canyonville, and some excitement exists there in consequence. McDonough, Kahler & Co., at Fort Lane, are cleaning up, and have found several pieces of gold worth from \$25.00 to \$30.00. More white miners are at work in Galice Creek district than ever before known. Several new claims are being worked there this season. Frank Bills has sold his mining interests to Jackson to A. D. McKee, and purchased the interests of George Armstrong and John Haskins in some mines on Sterling creek. A. W. Sturges informs us that the miners of Jackson district have had a very good haul of water this year, and that a large amount of ground has been stripped. All are sanguine of a good clean-up. Hays & Magruder, mining on Rogue river, recently made a partial clean-up that proved highly satisfactory. They will make a general one before many weeks, and the best of results are anticipated.

## UTAH.

**THE REBELLION MINE.**—*Salt Lake City Tribune*, April 1: From a gentleman just down from the Park, we learn that the Rebellion has a vein averaging 7 ft in thickness of solid ore, mainly carbonate, but with blotches of galena. It assays 50 ounces in silver to the ton, and carries about 50% lead. The chamber has been cut through for 400 ft. The mine is a good one, and goes into the mine the carbonates are thick. The gentleman, who is an old miner said: "I never saw a finer mine anywhere, and there can be no fair estimate placed upon its value." This is good for the "Rebels," and good also for the Park and the Territory.



## Visit of the Journalists to Southern California.

The following, written by Wm. H. Barnes, Secretary of the Pacific Coast Press Association, for the *Weekly Call*, contains so much that is briefly and well said, that we are constrained to give it at this date for the benefit of our readers:

The residents of Los Angeles and San Bernardino counties last June, through L. M. Holt, of Riverside, extended an invitation to the Pacific Coast Press Association to visit the citrus fruits of those two counties, and "to bring their friends with them." The railway authorities were interviewed, and through the courtesy of ex-Governor Stanford a very low rate of fare was obtained.

On March 21, 22 excursionists, representing 13 daily and 33 weekly publications of California, left San Francisco on the four o'clock P. M. train. Among the party were those who had grown gray in journalism, while others could give experiences in the service of the press for 30 years each. Some 30 ladies were included in the number, and good will and enjoyment ruled the hours as the express train sped along.

Quarter past eight o'clock P. M. at Lathrop for supper (and a good one), with the patterning train for an accompaniment, and then on through the dark night. At six o'clock A. M. of the 9th, Caliente was reached, at the foot of the Tehachapi mountain; all were up and eager to see the celebrated "Loop," the tunnels, engineering, etc. Your correspondent was personally given a ride in the car, and the engineer, and the climbing up hill began. A rain-storm, which ended in a heavy fall of snow, continued for more than two hours, interfering sadly with the views along the line, but sufficient was observed to pay a merited tribute to the engineering and energy which have built such a magnificent road through such a wild, forbidding country. Tunnel after tunnel, curve upon curve, until at last the summit is reached, and snowfalls are carried into the car to keep company with the winter winds and rains.

A downward run of 20 miles, and Mohave, the station for breakfast, is reached, a sort of created oasis in the desert; its surroundings merit its name—the land of desolation! A half-storm prevails at this point, and a wind blows, against which it is difficult to stand. The simple breakfast is quickly disposed of, and the shelter of the home-like cars sought. Miles upon miles of level waste are all around, with naught of even vegetable life, except the world desert yuccas standing like ghostly sentinels at regular intervals. As they disappear in the distance a rainbow shows its bright bow across the sky, not very promising for the day's weather, however, as the song says:

"A rainbow in the morning  
Is the sailor's true warning."

And sure enough, there is rain and to spare, in a little while. But sunshine comes again, the great San Fernando tunnel, one and one-quarter miles long, is passed, and at 1:55 P. M. "on time," Los Angeles is reached. Here there is but a brief stop for dinner, and the "express" moves forward until 7:10 P. M. when Caliente is reached, and the excursionists are met by Mr. Holt, of the *Press* and *Horticulturalist*, who, with a committee of his fellow-citizens, is present to conduct the excursionists to Riverside, eight miles from the station. Carriages are rapidly filled, assignments to hotels and private residences quickly made, and the excursionists are quickly cleared and the party on the road to their resting places. Bonfires and illuminations are passed, and many shouts are given and returned, amid the sound of rattling wheels.

March 10th, at nine o'clock, the party were about for a drive about Riverside. In each carriage was a resident familiar with localities, etc., and it is not exaggeration to remark that during the three hours' drive, said excursionists acquired more practical knowledge in regard to citrus fruits and the possibilities of southern California than they could have gained in any other manner. To begin, ten years ago, the land was an uncultivated plain; to-day, it is a Garden of Eden. More than 20 miles are driven over broad avenues bordered with palm and magnolia, and rows of groves of trees lined with oranges, lemons and limes. Acres of vines are seen, the famous Riverside raisins come from. Inquiry finds that apricots, figs, and scores of other luscious fruits are also grown in this favored locality. What has done it all? Brains, pluck and water—the first two in the individual, the latter on the land. Neither could have succeeded by itself, but combined, they have proved conquerors.

### Riverside

Is a colony of cultured, enterprising people, some 1,300 to 1,500 in number, living in a locality where plenty of water is furnished by an irrigating company, and where almost every tropical fruit can be raised successfully and profitably. Unimproved land, with water privileges, can be bought for \$100 per acre, while it would take \$1,000 an acre to buy some of the improved. There are many handsome homes in the colony, and the social and moral status of its people is not surpassed by any locality. Their hospitality and enterprise is proverbial, and no guest mar, unless he needs the home-served prosperity. This colony can but advance in population and wealth as time passes.

At two P. M. lunch is served at the Riverside and Glenwood houses, after which the citrus fair is visited. To say that the display astonished the visitors is to speak mildly. Here were between 30 and 40 varieties of oranges (one orange 18 inches in circumference), a dozen kinds of lemons, raisins that made the imported article seem common, figs, plums, olives, etc. By common consent the excursionists were taken to southern California had been but feebly and imperfectly understood hitherto, so far as this party was concerned—that its productions and possibilities had been entirely underrated; but that if forgiven for our unbelief and ignorance in the past, we would endeavor to do it justice in the future.

At eight P. M. a generous welcome was given by the citizens at Odd Fellows' hall, and sentiments and responses filled the time most pleasantly.

March 11—Eight A. M., and away to Colton, where Mr. Benedict takes a receipt from Mr. Morse, of the San Bernardino Committee, for "70 excursionists in good condition." and now comes a visit to the pioneer orchard of Mr. Van Leuven, and the visit to the citrus fair, which was begun in 1857; then to the home of J. A. Waters, and now by the ruined above walls of the old Mission, and next a rest at the lovely grounds of Mr. and Mrs. Crafts, known as Crafts. There is a long drive to the old-fashioned porch, loaded with the handwork of the ladies of the colony. The morning neighborhood. Delmonico never saw such a table, nor has it like ever been seen in San Francisco. Fruits, flowers, ornaments and substantial, and for waters—the fair donors of the feast. By common consent the excursionists were taken to Judge Willis was hearty and sincere, and the responses equally so.

In to-day's travel of 40 miles, orchards and grain fields, vineyards and grazing lands, are passed. Here is plenty of good land at low prices, and it is needless to say that every acre of this area profitable is to be used which has been used elsewhere, viz.: Brains, pluck and water. New San Bernardino, a handsome, well-built town of about 3,000 inhabitants is reached about 6 P. M.

The entrance of the excursionists was the means of gathering great crowds upon the streets. The San Bernardino Brass Band had kindly volunteered its services to the committee, and had been with the party all day, enlivening the hours with good music, and as the cavalcade of some 30 carriages drove into town, with said band at its head, it was very attractive to the ever-present "little people" in the vicinity, and the old folks had to be around to look after the "little ones, and the little ones were a crowd, you know." Notwithstanding which all were comfortably provided for at Starkey's and the Southern hotels.

March 12—A 6 A. M. call, quick breakfast and a three-and-a-half-mile drive to Colton, where was met L. M. Holt with a box of Riverside oranges, each four or five in number, delivered with many thanks by all. 7:10 train two and a half hours by rail and the Los Angeles committee is met at San Gabriel, and with teams are visited the great vineyards and groves of Messrs. Adams, Wilson, Stoneham, Shorb, Rose and E. J. Baldwin. Miles of vine and trees, and the party wears with the wealth before it. "Lucky" Baldwin insists that the party shall make at least a brief halt at his elegant residence, which is done, and an hour spent with this genial host, looking over his beautiful home and grounds, and a wandering in hot-house and on lawn, viewing the well-known racers of his stable, etc.

Next to Sierra Madre Villa, the beautiful retreat at the foot of the mountains, the excursionists find the most beautiful vineyard and foliage. Here a couple of hours are spent in enjoyment, and a view across the valley from this elevation of 1,200 ft. above sea level, is grand beyond description. Groves, vineyards and green fields lie like a picture before the gaze, and the question comes again, "What will a few more years ago this was but a trackless waste?" But it was even so.

Again a move is made, and the new land of Pasadena, another home for the citrus fruits, is visited. Here are homes of culture and refinement, and springing orchards and growing vineyards. What will a few more years ago, when so much has been done in so little time? At 6 P. M.

the ancient city of Los Angeles is reached, and the Pico House and Cosmopolitan receive the excursionists within their commodious quarters, just as a hoisterous wind begins to make its presence felt.

At 8 P. M. the Los Angeles club throws open its new rooms to the P. C. P. A., and extends a greeting to the visitors through the chairman, Judge Sepulveda, and the hospitality of the club, during the visit of the Association. After a meeting of the P. C. P. A., and the election of several new members, the evening was spent in social converse between the visitors and visited.

Sunday and Monday, 13th and 14th, were used in inspecting the City of Angels, of which so much has been written. Its old churches and adobe houses strongly contrast with its newer edifices. Here are found the old Spanish families and the latest arrival "from the East." The past and the present, "old times" and "Young America," are in the juxtaposition in Los Angeles. But a kindly greeting comes from all, and at evening, around the grand banquet table, over which ex-Governor Mansfield presides, are gathered the representative sons and daughters of many honored families, who bid a welcome to the visitors of the Press, which was keenly appreciated, and will not be forgotten.

In Los Angeles is the Wolfskill orchard, with its 40 acres of 40-year old orange trees, each one of which lifts its branches laden with golden fruit to the number of thousands. This grove alone returns a fortune every year.

The Citrus fair was visited on the 15th. The large Pavilion permitted display, and ten of thousands of oranges and lemons were in sight. The fruit of Santa Barbara, Ventura, Santa Luis Obispo, San Diego, and San Diego were here, in magnificent array. Language fails to convey an idea. Some one wrote of these Citrus fairs that "it was worth crossing the continent to see them." I endorse that sentiment, and the Californian who can raise a good crop of oranges, who bid a welcome to the visitors of the Press, which was keenly appreciated, and will not be forgotten.

On the 15th the excursionists disbanded, to return as they pleased, and the first trip of the Pacific Coast Press Association was over. More than 1,000 miles by rail and 120 by ocean had been traveled without an accident. Seventy-two people had been together for 10 days without an unkind word, a single jar or unpleasantness, or a word of politics, and it gave all more confidence in human nature than they had before. It was a rare opportunity to see part of their State, which is a pleasure and delight, at a reasonable price; second, it enabled a class of men who rarely get away from hard work a little recreation, and it gave them a correct idea of southern California, which they did not have before; fourth, it pleased the people visited, as it showed appreciation of their efforts and commendation of their enterprise and energy, which they most emphatically deserve; fifth, it proved that the excursionists were not only a pleasure to the people they associated together for days and "agree to disagree" in harmony and good will.

I have noticed in one or two journals an effort made to convey the idea that those who went upon this excursion were not regular or known journalists, etc.; but as one fully acquainted with those who were present, and with their reputation and services, I will merely say that some of the oldest editors of this State were among the number; that 22 journalists were represented by their own editors, and the others by reporters duly accredited by the managers of said journals. As to the P. C. P. A. itself, none but bona fide editors or proprietors are eligible to membership.

There is no doubt that the P. C. P. A. had a most delightful time, and experienced a succession of pleasant and enjoyable surprises. There is also no doubt that all would be pleased to go again to this or some other locality, and that a vote would be given unanimously in favor of the next excursion.

[Mr. Barnes modestly omitted mention of the presentation, by members of the association, of an elegant gold-headed cane to the President of the association, Scipio Craig, and a fine diamond ring to the Secretary. The whole-souled manner in which our southern friends universally extended their hospitality to the party, certainly reflects credit to the name and generosity of each.—EDS. PRESS.]

### Diseases of Miners.

In the *Popular Science Monthly* for March, a summary is given of the diseases of miners, as they have been specially studied by Dr. Paul Fabre, of Commeny, France. The diseases prevalent among workmen who labor in damp or wet galleries are largely governed by certain accessory circumstances. No morbid symptom is developed among those who work in a gallery which is simply damp and of a temperature not exceeding 58°. But if cold water falls upon them, or if they have to put their legs in water, they become subject to lumbago, sciatica, to indefinite pain in their limbs, and often rheumatism, generally subacute, sometimes chronic, most frequently localized in a single joint—generally that of the left knee, on which the pickmen and heavers rest in working. In galleries saturated with moisture, and where the temperature exceeds 70 or 80°, the workmen are soon overcome with an extreme lassitude; they get hot, they gasp for breath, the sweat rolls down their bodies, and they are obliged to stop working and rest for awhile in a cooler spot. A rapid evaporation compels frequent change of the men in the gallery, and endural or military eruptions occur, sometimes boils, rarely eczema. If, while the gallery is constantly damp, the air is vitiated by poisonous or irrepressible gases, and if the water contains sulphates or sulphuric acids in solution, the men, in addition to pains in their limbs and difficulties in breathing, experience lively itching and painful smarting wherever the surface of the skin has been abraded. Those who have labored for a long time in the damp galleries contract a chronic inflammation of the gums, together with muscular pains in the limbs, and have often intestinal troubles and spots of purpura. These phenomena indicate the coming of a mild form of scurvy. The remedies are improvement of the sanitary conditions of the mines and the homes of the miners, and the usual applications for scurvy whenever the symptom of that disease appear.

**RICH DISCOVERIES.**—A letter from Pitkin, Colorado, says that great excitement prevails there over the discovery of carbonates, and the whole Park, clear down from the Silver Islet mine is being staked off by an eager and lazy mob of men. A body of gray sand carbonates, 4½ ft. thick, has been found in the main shaft of the Silver Islet, at a depth of 50 ft. Assays give 132 ounces of silver, 168 ounces and 264, and about 40% of lead. In the Garfield lode, situated in the Park, carbonate running as high as 170 ounces of silver and 60% of lead were discovered at a depth of 60 ft. The Chicago lode is proving one of the best in the district. The shaft is 60 ft. deep, and an adit-tunnel has been driven in on the vein 85 ft. Further down the hill a tunnel has been started that will cut the vein 300 ft. deeper than the above named workings.

## Washington Territory Mines.

### The Silver and Gold Districts.

The Smilkameen, or Mount Chopaco, silver mines in Stevens county, Washington Territory, are about 15 miles by trail west of the junction of the Smilkameen and Okanagan rivers, near the line of British Columbia, about 120 miles east of Port Hope; the same distance west from Fort Colville, and 200 miles northwest of Ellensburg, in Kittitas valley, Washington Territory, which is on the main traveled route, and the trade center for all the gold and silver mining districts of the Swank, Peshastin, Wenatchee, Methow and Smilkameen; being, also, on the old miners' and military routes from The Dalles in 1856 and 1865, and making a shorter distance from Portland by nearly 300 miles than any other route, besides being through a settled country and having every facility for the camper in provisions, outfit, grass, wood and water.

A correspondent of the *Oregonian* says: The silver mines of best promise are in the treeless mountain just opposite Mount Chopaco, and this silver mountain, or mountain of silver, was thrown into mass by internal upheavals, and separated, or elided off, from Mount Chopaco by the after period of channeling waters, as in river-ravine process they receded from their ocean region. The landscape is at once grand and awe-inspiring. It impresses one with dread and veneration. Bold Mount Chopaco rises suddenly abruptly, and almost perpendicularly to an elevation of 6,000 ft. above the river, and is presented in its Indian legendry and magisterial character by all colors, classes and sizes of massed rock and shades of etripes in shale and shelving boulders.

The summit is closely dotted with evergreen cedars, firs and pines, while around its base run the beautiful, clear, cool, pure, snow-sourced waters of the silvery Smilkameen river, which is fringed on both of its borders with groves of cottonwood, willow, wild cherry and alder. On both sides of the rapid-running river are level flats of land of good soil, densely covered with grasses of all kinds; and, through the "Coolies," are very picturesque lakelets, meadows and shimmering creeks. Around the mountain of the mines, which rises between the Okanagan range and Mount Chopaco, and which has an altitude of 1,500 ft. from its base, the Smilkameen river crescents like a horse-shoe bend, and on both sides of the mountain do the quartz ledges crop out on the surface in plain view for miles in length of the range, while the greater and still grander portions of the range are, as yet, unexplored, unprospected and uncared for.

There are several ledges worked, and one tunneled to quite an extent, yielding a fine view of mineral in eight that has assayed very largely to the ton, and will, on further deepening and development, yield as rich a return as ever Nevada or Colorado's champion mines produced. The true discovery of these Mount Chopaco mines was made seven years ago, and their real worth is not yet ascertained; enough being known now, however, to cause the formation of large and wealthy mining corporations to invest heavily in their near development. Companies are being formed in San Francisco, Chicago and New York.

The founder of the mining district is Hiram I. Smith, the well known old miner.

Edward Phelps, Marshall Blinn, Henry Wilington and R. L. Johnson have large interests in these mines, and as they are all largely known for enterprise, the Mount Chopaco silver mining district will, without doubt, loom to fame and fortune in 1881.

It is well known that the richest mineral lands in Washington Territory are in and on the Moses reservation, and it is also well known that Moses himself is not, and never intends to be, on that reservation. His garden home, and that of his fathers, is in the Grand Coolie east of the Columbia river, and there he will habitate, all grants to the contrary notwithstanding.

There will be considerable work done in the Peshastin mining district this season. This gold-bearing district is a ready source of permanent wealth to the actual miner, and it is too well known to need further comment. It is 40 miles north of Ellensburg, has several arastras running in the summer season, and its miners, like all large bodies, move slowly, for reasons best known to themselves; and they, being all "old timers," have sense enough to keep what they do know from spoiling. They all have what gold they want, and that ends it.

The Swank mining district is 25 miles north of Ellensburg, and has the reputation of producing, occasionally, the largest gold nuggets found on the coast. It is settling up very rapidly with practical placer miners, and is on the eve of great distinction. It is in a grand country, well supplied with wood and water, and supposed to be at or near the richest "gold diggings" outside of California. It is an old mining district, first worked under the supervision of King Solomon, of temple fame, who called this whole upper country "the land of Ophir."

**ARTESIAN WATER IN BOSTON.**—For some time past boring for artesian water has been in progress in Providence street in the city of Boston. The chances of success were generally believed to be against the effort. Quite recently, however, water has been found at a depth of 1,550 ft., and the well is now capable of delivering from three to four hundred thousand gallons of water a day.

## The Monolithic System of Breakwater.

Mr. Kinipple, harbor engineer of Westminster and Greenoch, has patented his monolithic system of forming sea breakwaters and harbor walls. This invention enables harbor works to be constructed in jointless masses of concrete *in situ* without the aid of divers, stagings, or overhead travelers; in fact, without the use of the ordinary costly plant. The system has been experimentally tried with success at New York, Quebec and Greenoch, and last year it was also experimentally used by the patents at Wick, in the reconstruction of the south pier-head upon its old, or rubble foundations. The Government Loan Commissioners granted a sum of from £10,000 to £12,000 for these repairs, and for the extension of the head this year for 40 ft., so as to render last year's repairs safe against any seas which may enter the bay of Wick. The extension will be of the same monolithic construction, and founded deep into the hard clay of which the bottom of the bay is composed. At Wick any breakwater which is not of monolithic construction from foundation to parapet cannot be relied upon as safe against all contingencies of sudden and severe storms. There are numerous places, it is believed, where, had this system been used instead of the ordinary blocks or bags, the breakwater would have been in existence at the present time, and at 40% less cost. One of its chief merits is its simplicity and reliability, for any breakwater in the most exposed localities can, it is asserted, now be constructed at about one-half the usual cost, and certainly within one-third of the time formerly occupied in executing these works, for there is nothing whatever to prevent breakwater being commenced at its head, center, or foot, or being carried on simultaneously from end to end. No skilled workmen beyond ordinary laborers or fishermen are required, and, indeed, a present of a hatch of Portland cement to some of the poorer fishermen is all that is necessary to enable them to repair or construct small breakwaters along the coast. The system is well adapted for founding on rocky or irregular bottoms, but in many cases trenches would have to be dredged by dipper or other dredges for the reception of the concrete. The concrete is mixed either in bulk or in blocks, and allowed to set or harden out of water, so that when thrown overhead into the foundations or works it is hard enough to prevent the cement from separating from the sand and shingle while passing through the water, and soft enough when in the work to fall together and to become one compact mass, equal in strength after a short time to the natural rocks. Where the walls are required to be vertical or battered, a few iron rods are used with sliding planks to retain the concrete in form for a few days until it is set. At Wick recently, masses of concrete cast in this manner resisted a heavy storm within 24 hours after they were put in, while stones of several tons weight were hurled in every direction by the same gale.—*Engineering and Building Times*.

**THE TALES OF OLD MINERS.**—An Eastern exchange says: An old miner, who has had 15 years' experience underground, says that he has observed one peculiar fact, that between 12 and 2 o'clock in the night if there is a loose stone or bit of earth in the mine it is sure to fall. Says he: "About this time it seems that everything begins to stir, and immediately after 12, although the mine has been as still as a tomb before, you will hear particles of rock and dirt come tumbling down, and if there is a caving piece of ground in the mine it is sure to give way." This is of a piece with the old story about water mills doing more work in this night than in the day time, because of the water being heavier in the night than during the day—pressing more strongly toward the center of gravity, and therefore bringing more force to bear on the wheels. It may be that in some localities water mills would do more work of nights in hot weather than during the day, as, on account of a suspension of evaporation in the stream, there would be a little more water. It is about midnight that ghosts walk, as is told in old tales, and therefore it is probable that about that time some old miners may be making more diligent use of their ears than at other times. Rats begin to run about the mines before a big cave, and serve as a warning to miners in old levels, but this is because these animals first detect the movement caused by settling in the waste rock filling among which they live, and probably begin to find themselves pinched in their holes.

**BIG FIND.**—Last Wednesday old Uncle Dan Breen came into town and surprised the citizens with evidence of his perseverance and industry in mining, by exhibiting a specimen of solid gold recently taken from his claim, on McCal's flat, Merced river, weighing 21½ ounces, and valued at \$350. This, together with \$60 in coarse gold, all lay in a space of ground not exceeding a foot across, and required but a moment's labor for Uncle Dan to take it all in, which he did. This is an extensive placer claim, situated above Hall's gulch, on the bank of the Merced river, and formerly owned and worked by the Cope Bros., many years ago.—*Mariposa Gazette*, Mar. 20th.

**THE NEW SAN PEDRO DISTRICT** bids fair to become one of the greatest feeders to Tucson has yet sprung up. It is looking up, and the recent discoveries of coal in the immediate vicinity have made that region probably the most extraordinary in Arizona.



## Tioga District.

A private letter gives the following information about this district:

I found that Tioga is situated on the western slope of the main range of the Sierra, at the head-waters of the Tunlunne river and Lee Vining creek, the former flowing to the westward and the latter easterly and emptying its waters into Mono Lake. There is certainly the finest bodies of timber I ever saw on the Tunlunne, both as to extent and quality. In fact a supply that would furnish both Tioga and Mill creek for years to come, should either or both camps assume the foremost rank as mining locations on the coast.

The first croppings and prospecting we encountered were at the head of Bloody canyon, on what is called Mt. Gibbs. Here I saw a very interesting formation, but with very little work done. Continuing our course down the Toolunne for five or six miles, we arrived at the Mount Dana cabin on Tioga hill, the original discovery point of this district.

The country rock is of an entirely granitic formation, and seems to have split into two parts, one running almost north by the way of Mt. Dana, and the other northwesterly, thus forming an acute triangle in whose southern apex Tioga district is situated. The veins or pay streaks lie between slate, porphyry and syenite, and vary from 10 to 20 ft. in width, in an upthrust of some two to three miles in width by six to eight miles in length, while the veins are clean-cut and well defined. The Mt. Dana shaft, 5½ x 7½ ft. in size, at the time of my visit had attained a depth of 62 ft. The ledge was dipping easterly at an angle of from eight to ten degrees, but I am inclined to the opinion that the dip will change to the west when a sufficient depth has been obtained, as this west granite wall of the mineral belt or range has that inclination. The true walls of the ledge have not been exposed in the Mt. Dana shaft, while at the bottom the vein carries full three and a half ft. of ore assaying, by average sample that I took to San Francisco, from \$80 to \$300 per ton. The ledge lies between

## Slate and Porphyry,

In gangue or vein matter. The croppings on the Mt. Dana, averaging about 15 ft. in width, are well defined the entire length of the location, 1,500 ft., though in places the slate laps over, forming a cap. The Sheep Herder ledge, 20 ft. in width, shows, by three surface cuts, 10 ft. breasts of ore in each cut. Each cut shows six inches of clay gangue on the foot-wall. The average samples I took from this ledge and had assayed at the Bay gave assays averaging about \$80—I have forgotten the exact figures. I also inspected the Beven, Anstis, Tioga Chief and other claims too numerous to mention, and found that but little work had been performed. The ledges are parallel and continuous. Water is abundant and never failing, and in this respect and in the matter of timber the facilities for the economic working of mines and operating mills are unsurpassed anywhere.

The above is a hasty summary of observations made on a flying visit, and includes about all of interest that I can now recollect of Tioga. My present intention is to visit the district again.

## Copper.

Probably there is no metal capable of producing so very many distinct alloys as copper. These different alloys are distinguished as much by their characteristics as by their color. And in the latter case the color may be made to vary from the red of the original copper to the almost blank white of silver. Take the composition of the widely used Babbitt's metal, employed throughout the world as bearings for journals and in places where friction comes. It is nearly pure white, and yet out of 100 parts of tin, antimony and copper, the copper makes one-twenty-fifth, the exact proportions being tin, 89; antimony, 7.3; copper, 3.7.

And there are bronzes used in the arts which have so slight an admixture of lighter colored metals with the copper as scarcely to change the color of the original and basic metal. In iron, the compounds, or changes rather, are so slight that it is a puzzle as yet not entirely solved, to discover and produce the exact change from fibrous wrought iron to crystallized steel. There are mediums between these two extremes, but these are the extremes, and to produce these from the original metal, and to produce any of the grades between, requires a nicety of manipulation and a knowledge of chemistry and metallurgy that it takes years of application and patience to compass.

It seems as though a promising field is before the metal worker in the working of copper and its compounds. The number of metals with which copper will form useful alloys is so great, and the variations in the character of the alloys are so many, that there can be little doubt that there are resources in copper, in its use in the arts, which have not yet been exhausted.—*Maine Mining Journal.*

A SUCCESSFUL MILL.—The Yankee Fork Herald says: The Gen. Custer mill is turning out about \$4,000 a day in bullion, notwithstanding the frequent stoppages and delays caused by some portion of the mill not working properly. From the present workings of the mill we are satisfied that when it is in perfect working order the output of bullion will exceed that of any mill of equal capacity in this Territory.

## USEFUL INFORMATION.

## Salicylic Acid as a Dressing for Textile Fabrics.

The field for the utilization of salicylic acid is rapidly being widened. Experiments recently made in England show that raw wool washed in a solution of this acid, one part; soft soap, 500 parts; water, 2,000 parts, did not show the least sign of mildew after being stored for a considerable period. Yarns intended for storing were successfully treated in the following way: In greasing them during the process of carding, one part of salicylic acid was added to 500 parts of grease or oil which was used. This small quantity of salicylic acid entirely prevented any signs of deterioration by age, and entirely takes away that offensive smell of rancid oil so often observable. Woolen cloth, when treated in the last wet process with a solution of one part salicylic acid to 500 parts of water, retained its gloss much longer than by any other process hitherto employed.

In finishing cotton goods salicylic acid was added in the proportion of from one to four ounces for every hundred pounds of material being finished, and the goods thus treated were preserved free from mildew or decomposition, even with a prolonged storage. Warp which had been kept for a long time upon this spindle was kept fresh and sound when subjected to the same treatment. The addition of from one to four ounces of salicylic acid to five gallons of finishing material will be found an infallible agent for warding off an attack of mildew from cotton textile goods as well as preventing the unpleasant smells they are so liable to. While not indispensably necessary to goods which are disposed of soon after their manufacture, the addition of salicylic acid to the finishing material will be found to have great favor with the public from the fact that goods keep their original appearance, don't mildew, and do not take on a bad odor when being kept in stock or shipped on a long journey.

DIAMOND INK FOR WRITING ON GLASS.—A mixture for writing on glass has lately been put on the market, under the name of "diamond ink," which is pronounced to be a very useful article for druggists and others for labelling bottles containing substances which would destroy ordinary labels. It has been examined, and found to consist of a mixture of ammonium fluoride, barium sulphate and sulphuric acid; the proportions of its manufacture being, barium sulphate, 3 parts; ammonium fluoride, 1 part; and sulphuric acid enough to decompose the fluoride and make a mixture of semi-fluid consistency. This mixture when brought in contact with a glass surface with a common pen, at once etches a rough surface on the parts it comes in contact with. The philosophy of the action is the decomposition of the ammonium fluoride by the acid, which disengages hydrofluoric acid, which attacks the glass; the barium sulphate is inert and is simply used to prevent the spreading of the markings. The mixture must be kept in bottles coated on the inside with paraffine or wax.

HOW TO GRIND A GLASS PLATE.—It is sometimes useful to know how to impart a finely-ground surface to glass suitable, say, for a focusing screen. Mr. C. S. de Joux, good-naturedly sends us, all the way from Mauritius, a simple method he has practiced, which certainly deserves to be recorded. Finely-ground sand or river mud—or, what is better still, the sediment from a grindstone—is well stirred up in a bowl of water, and after a few minutes the upper half of the liquid decanted off. The decanted liquid contains all the finer particles, and these, after subsiding, are collected in a watch glass. The sheet of glass is laid on a damp cloth spread upon a table, and the watch glass and mud used as a muller, the convex side of the watch glass supplying a good hold for the fingers. In a quarter of an hour a satin-like polish will be obtained, admirably adapted for focusing. A rinse with water will show if the grinding has been uniform.—*Photo News.*

COPYING DRAWINGS.—By a method patented by M. Joltrain, of Paris, it is claimed that copies of drawings having nearly black strokes on a white ground can be made by the following sensitizing mixture: Gum, 25 grammes; chloride of sodium, 3 grammes; perchloride of iron at 45° B., 10 cubic centimeters; sulphate of peroxide of iron, 5 grammes; tartaric acid, 4 grammes; water to fill up to 100 cubic centimeters. The developing bath may be a solution of ferrocyanide of potassium, red or yellow, acid or alkaline. The printing is done in the ordinary way, and the developing in a bath of red or yellow prussiate of potash. After washing, the proof is put into an acidulated bath, which darkens the lines to an indigo tint, and is then again washed and dried.

HARDENING STEEL.—A Sheffield paper says: A very fine preparation for making steel very hard is composed of wheat flour, salt and water, using, say, two teaspoonfuls of water, one-half a teaspoonful of flour and one of salt. Heat the steel to be hardened enough to coat in with the paste by immersing it in the composition, after which heat it to a cherry red and plunge it into soft water. If properly done, the steel will come out with a beautiful white surface. It is said that Stubb's files are hardened in this manner.

PLATINUM WORKING.—The only platinum worker in the United States is Joaquin Bishop, of Sugartown, Pa. At the time of its recent meeting in Philadelphia, the Association of Mining Engineers made an excursion to the works of Mr. Bishop to see his working of the intractable metal. Mr. Bishop, who gets most of his supply of metal from the Ural mountains in Russia, has been working platinum for 40 years. In 1845 he took a premium, but at that time the demand for platinum was so small that it only occupied him one day in the month, using the metal principally for rivets to fasten artificial teeth. Before the engineers, Mr. Bishop melted a piece of platinum with the ease that a plumber melts lead. The intense heat used may be imagined when it is known that a steel file held in the blast burned like a piece of wood. The Russian government used platinum in its coinage until 1864, when about \$2,500,000 worth of platinum coins had been struck.

THE CEMENTATION PROCESS.—A new theory of the conversion of bar iron into steel by the cementation process has been advanced by Mr. R. S. Marsden. He attributes the result to the diffusion of the carbon in the condition of an impalpable powder into the heated iron, and he believes that silicon can diffuse itself in a similar way through iron. This action of the carbon in iron is analogous to the penetration of a red-hot porcelain crucible by carbon, a phenomenon which was observed and commented upon by the author some time ago.

PHOTOGRAPHING MUSIC.—An English paper tells of a gentleman, who, on being asked to sing, produced from his pocket a little case which contained his music, photographed down to the size of note paper. He had duplicate copies of the song, and handed one to the accompanist, singing from the other himself. The expedient saved all the bother of bringing a roll of music, unfolding it, collecting it again, and so forth.

A CHILD'S dress made of flint glass and trimmed with lace made of the same material will soon be exhibited in a show window in Pittsburgh. It is now at one of the trimming establishments, and is nearly completed. The dress glistens like the finest satin, and is marvelously beautiful. The fabric from which it is being fashioned was spun and woven at the glass factory of Messrs. Atterbury & Co., Pittsburgh.

IMITATION ROSEWOOD.—Boil one-half pound of logwood in three pints of water till it is very dark red; add one-half ounce of salt of tartar. Stain the work with the liquor while it is boiling hot, giving three coats; then with a painter's graining brush, form streaks with the following liquor: Boil one-half pound of logwood chips in two quarts of water; add one ounce of pearl ash, and apply hot.

## GOOD HEALTH.

## Brain Work and Sleep.

So long as the brain worker is able to sleep well, to eat well and to take a fair proportion of outdoor exercise, it is not necessary to impose any special limit on the actual number of hours he devotes to his labors. But when what is generally known as worry steps in to complicate matters, when cares connected with family arrangements, or with these numerous personal details which we can seldom escape, intervene, or when the daily occupation of life is in itself a fertile source of anxiety, then we find one or other of these three safeguards broken down. Probably the man of business or the successful lawyer fails to free himself from his anxieties at night, and slumber becomes fitful or disturbed. The nervous system, unsettled by the mental strain, brings about various defects in nutrition; the appetite fails, and then we meet with the sleeplessness, the dyspepsia, the irresolution, the irritability and the depression which are the chief miseries of the overworked.

The great thing in these cases is to get a rest at any cost. By rest we do not mean doing nothing, but rather change of scene, of thought and occupation. If you tell a busy man that he must do nothing, he may endeavor to obey you, but he will soon find out that he cannot, for his brain keeps on working in the same old groove, and he is as much, or even more, worried about his business as if he were still in the thick of it. The great thing is to get rest by substituting one kind of work for another, to have for a time a nice, comfortable sort of occupation to replace the old weary round of troubles. One of the most important remedial agents is outdoor life and exercise, which may be taken in any form most congenial to the individual—riding, walking, field sports, or what not. This is at once the most natural and often the most effectual promoter of sleep we can employ.

Active bodily exertion is well known to be incompatible with the maximum of intellectual work, and full advantage should be taken of this fact. The only thing to avoid is excessive fatigue. It is a remarkable fact that a very large number of distinguished literary and scientific men have suffered severely from the malady by the adoption of some simple hygienic measure. One, for instance, cured himself by

following the prescription of a farrier, who advised him to drink water, eat little and take exercise. Another was cured by drinking every day a large quantity of fresh water, and exchanging a highly nutritious regimen for a much lighter dietary. A third got rid of his old enemy by the same means, and by taking exercise every day before dinner. There can be no doubt that in many cases great benefit would be derived from a thorough change of locality or climate. Long sea voyages are not unfrequently attended with excellent results, the attacks being absent for months at a time. Unfortunately these are remedies not within the reach of all.

RATTLESNARE POISON.—One of the saddest sights we ever saw was that of a man, aged about 55 years, who stopped at the Ksandal House, in Evergreen, last Saturday night. On the 10th day of last August, about noon, while herding cattle on the Texas plains, he fell asleep, and while in this condition he was bitten on the left arm, just above the wrist, by a rattlesnake. He was at the time a great way from any town or village, and by this time he reached a physician the poison had permeated his entire system. From that very moment he began to die, and to look at him you can at once see that upon him the "King of Terrors" has already set his seal and has only granted him a respite for a while; but the days of that respite are full of torture, and no doubt the poor, unhappy victim lugs for the end to come. Last Saturday night he was suffering indescribable torture. In his agony he called upon the Great God and upon feeble man to give him relief, but not a moment was he free from pain that was so terrible that language cannot describe it. His body is now full of the most loathsome sores, from which the poison continues to exude. His death is only a question of time, and when it does come it will be to him a happy riddance from suffering. *Conevah (Ala) Star.*

SINGULAR EFFECTS OF NITRO-GLYCERINE.—A foreign journal mentions the case of a lady suffering with cramps in the stomach, and to whom something less than a drop of one per cent alcoholic solution of nitro-glycerine was given. In two minutes the pulse fell from 140 to 50, a clammy sweat covered the patient's features, and she became senseless. Stimulants to the nose, and brandy, were quickly given, and in about three minutes more she began to recover—the pain was completely gone, and did not return all that night or the following day. The patient said she felt like two persons, and so strong was this impression, that though perfectly rational in her conversation and unexcited in her manner, she could not shake it off.

BREATHES THROUGH HIS EARS.—A barber in Altona announces his ability to live 10 hours with his nose and mouth hermetically sealed. Those acquainted with him see no reason why he should not be able to accomplish what he claims, for he is able to breathe for a time without the use of mouth or nostrils, communication between his lungs and the outside world being kept up through his ears. When smoking a cigar he often exhales the smoke through the same extraordinary channel, to the profound astonishment of those who are unaware of this freak of nature.

MUSIC IN DISKASE.—Dr. Oscar Jennings, a physician of standing in Paris, writes to the *London Lancet*, that in the treatment of mental disease he has constantly used music, which calms and soothes the mind, and declares it to be too precious an agent to be neglected. This is both scriptural and poetical indorsement. Saul of Tarsus was cheered by music, and the poet recognizes it as the soothing of the savage breast, while Shakespeare denounces "the who has no music in his soul is fit for stratagem and spoils."

TURN-UP HATS.—In regard to children's hats, reference is made by the *London Lancet*, objecting to the senseless fashion of turning up the brim of the hat in Tyrolean, or Spanish fashion, so that "infants and little folks of tender years have half-closed eyelids, corrugated brows, and faces screwed up by the glare of the sunshine, from which the brim of the hat, if correctly used, ought to protect them."

COPYING FROM THE MICROSCOPE.—Dr. Baale gives the following as the simplest method of copying an object magnified in the microscope: Arrange the paper on a piece of stiff cardboard, so that it may be upon the same level as the stage upon which the object is situated, on the left side, if the right eye is the one used for observation. If we now look steadily at the object with the right eye, it will be found that the object appears to be thrown, as it were, upon the paper, and it may be clearly seen by the left, and its outline be very readily traced, the movements of the pencil being executed by the right hand, if the observer is not able to use the left. By far the best course, however, is for the observer to acquire the habit of observing with the left eye, in which case the paper can be placed on the right hand of the stage, and the right hand used for drawing. With a little practice the relative position and correct size of objects may be insured in this manner.

LONDON capitalists received \$1,875 from the Oregon hydraulic mine of Oregon, last year, being at the rate of 62½ cents per share on 3,000 preferred shares.





W. B. EWER.....SENIOR EDITOR.

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#### SAN FRANCISCO:

Saturday Morning, April 9, 1881

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#### The Week.

There is not much new to record in mining matters other than what our summary gives. Many miners in different parts of this State, Nevada and Utah are getting ready to go to the Wood River country, Idaho. It is too cold up there yet for men to travel much. We have just been reading of a trip there, in which we see the following statement:

They struck snow 14 miles this side of the Cottonwoods, left their wagon box eo as to lighten up as much as possible, and traveled nights from 3 o'clock in the morning until the sun got up and softened the snow. It was very slow work. They had to dig through the snow from three to four feet and clean off a place for a camping ground, and then dig away snow and cut sage brush and build a fire and sit around it all night to keep warm.

Provisions of all kinds are scarce in Bellevue, and command high prices. The stage goes loaded every day, and men are going in on foot by the dozen every day, and without either grub or money. Tregaskie said he had to feed every man that he met. There is no sense in starting for the mines for three or four weeks. He has been in the mountains all his life, and had many a hard trip, but this was the toughest trip he ever experienced.

The Legislature convened in extra session on Monday, being given 20 days to do up the work which should have been done at the regular session. Thus far there has been much talk and little actual work. In Congress there has been much talk, also, and the Senate is at a deadlock between the two leading parties, and can neither organize or do anything else. Both sides are unyielding, and threaten to sit their time out before giving up the points they contend for. The only consolation the country can get out of the situation is that the Senators might be doing something much worse than fighting each other with words.

#### Mining Experts' Reports.

Ons De Kay has brought suit against Prof. R. W. Raymond to recover \$21,000. He alleges that Prof. Raymond's report of the value of the mines of the Chrysolite Mining Co., Leadville, Colorado, was false in its statements, and he was deceived by it into investing money in the Chrysolite stock. Prof. Raymond testified that after he arrived in Colorado, he received a commission to examine the Chrysolite mine. He walked about 4,000 ft. in the mine, and based his estimates on what he noted. He wrote his report on the night of the day he made the examination, and received \$5,000 for it. He estimated that the company owned about 108,000 tons of silver ore, worth, at the smelter's price, about \$7,000,000. Raymond said he felt justified in congratulating the company upon the "possession of a bonanza."

This suit is likely to decide a very important question, which is, whether experts can be held liable for statements in their reports. The decision may, therefore, excise a great moral influence.

If it is held that experts may be held liable, then we must have a legal definition of an expert. Does any body know what one is? The term is a very indefinite one, and of late has fallen into disrepute in this part of the world, like the title of "Professor," which is honorary elsewhere, but here only considered so when applied to educators. Charlatans have taken unto themselves the title of professor, and the same class have adopted the "mining expert" title. Seven-eighths of the people here who travel around as mining experts have no right whatever to be considered so, other than that they are expert enough to make a living out of mines without owning any, without working in any, and without knowing anything about them.

Because a man can go to a mine and write up a description and report about it, which is intended to sell the property, it is no proof he is an expert. In fact, most of the reports gotten up to sell mines are not by experts. Men with real knowledge on these subjects, and above reproach in character, are not in demand here. It is the class who will report favorably on anything, who get most of the business of experting; and for this reason is it that "mining expert" has become a term not greatly desired by men of position. The real mining engineer, educated as such, is satisfied with his title as he earned it.

But if the suit to which we allude is decided so that experts will be held to their statements, will not this really increase the number of unreliable ones? People cannot well be imprisoned for this kind of thing, and the class of men who will make false reports will not be apt to yield much in pecuniary damages.

Reliable, upright, educated mining engineers, such as should be employed by people with honest intent, are not afraid of being held to their statements. These are not made carelessly or without thought and study. At the same time mining engineers, no matter how highly educated or experienced, are liable to errors of judgment like other people. In making their examinations they may be more or less influenced by the desire of those by whom they are employed, and this perhaps unconsciously, and it by no means follows that because a mine turns out better or worse than might be anticipated from the report there has been any intention to deceive. In Prof. Raymond's case, the only matter of surprise to us is that he examined the mine and wrote the report the same day. The gentleman's reputation has not been such that people who know him will believe he deliberately made a false report. It is much more probable the statement made was an error in judgment, the conclusion reached being based on conditions which were not what he supposed them.

THE MILL AT PIKE CITY, Sierra county, has shut down after having made a very satisfactory run of 32 days. The shutting down, however, a correspondent writes us, is for the purpose of adding another 10-stamp battery to the new mill, which will be put in immediately, and he completed by the time the pumping machinery clears the shaft of water, and the necessary work of timbering is finished. All of this will take three or four weeks, when the mill will start up again.

THE SUTRO TUNNEL AT SUTRO.—The people of the town of Sutro are on the "ragged edge" as to the ownership of the tunnel. The *Enterprise* says they reason that if the bonanza people have secured control of it the fact shows confidence in the future of the Comstock and means something for the tunnel besides a mere drainage proposition. They think it indicates high concentration and reduction works at or near them and renewed life for their town. Such works as would be required there would give steady employment to a great number of men.

LOST THEIR BIT.—The head of the diamond drill has been broken off in No. 2 drill hole from the bottom of the Ophir-Mexican mine on the 2700 level. When a hole becomes 200 to 300 ft. in length there is a great strain on the stem of the drill, and it is liable to twist in two. The drill head will be recovered when the hole is followed up with a drift; meantime, another bit can be employed in a new direction.

#### Commissions on Sale of Mines.

A suit was decided in this city this week by the Supreme Court, the points in which are of great interest to all mining men, as questions have before this given rise to frequent disputes between the owner and the broker or seller of mining property. The case was that of Dolan vs. Scanlan, and arose out of an action to recover certain commissions which it is claimed the defendant agreed to pay to the plaintiff for selling certain mining property.

The complaint alleges that the defendant was the owner of a mine in Mariposa county, called the Golden Virgin mine; that he employed the plaintiff to sell it for him; that he agreed to pay plaintiff for his services, in making a sale, the sum of \$5,000; and that the plaintiff did, in pursuance of his employment, on the 20th day of May, 1877, negotiate and complete a sale of the mine to one C. W. Thomas for \$20,000; yet the defendant refuses to pay him his commissions therefor.

The allegations of the complaint are denied by the answer. The court below gave judgment in favor of the plaintiff. Defendant moved for a new trial, on the grounds, among others: "Insufficiency of the evidence to justify the decision of the court; and the same is against law. The evidence being insufficient in this:

"(a) That it failed entirely to show or establish any contract whatever between the plaintiff and the defendant.

"(b) That said evidence failed to show that plaintiff found a purchaser for said mine.

"(c) That the evidence does show that the defendant himself procured the purchaser, and actually sold the mine himself, unaided and unassisted by the plaintiff."

The motion for a new trial was denied, and from the order and judgment the defendant appealed.

This in brief is the statement of the case. Judge McKee, in deciding it, says:

To recover in an action for brokerage or commissions for a sale of real property, two things are necessary to be established: First—That the plaintiff was employed to make the sale. Second—That in pursuance of his employment he found a purchaser in a situation ready and willing to complete the purchase on terms agreed upon.

It appears by the record that in the year 1876 the defendant was engaged in opening the mine referred to, and, at the same time, trying to sell it. While so engaged he availed himself of the proffered services of the plaintiff, who resided in San Francisco, to buy for him certain articles of machinery for a 5-stamp mill, which he was putting up on the mine, and to forward them to him. He had bonded the mine to a party, and others were examining it with the view of purchasing it, but they all failed him; and becoming anxious to sell, as he had not the requisite

#### Means to Develop

It, he wrote to plaintiff on the 16th of January, 1877, as follows:

"What I want means to open the mine properly, or to sell it. \* \* \* Now, I would like you to see it, and you could get a party to buy, so as you could make \$5,000 or \$10,000. I would like you to make it sooner than anyone else. When you answer this I will tell you in my next letter what I will take for the mine. \* \* \* Write soon and let me know if you can get parties to buy. But I reserve the right to sell as soon as I can."

In answer to this letter the plaintiff wrote on the 22d of January, 1877, \* \* \* "If I can, I will go up to see you and probably be able to do something for you. \* \* \* Let me know when you write again how much it will take to put an incline from the tunnel to the mill. Let me know all the particulars, and your lowest price for the mine. You know it will be secret between you and I. I only want to know how to work. I will do my very best for you." On the 14th of March, 1877, defendant wrote again to the plaintiff as follows: "I must sell the mine or part of it. \* \* \* There is fine rock in the level where the vein is solid, but I can't get it without a pump. The mine is a good one, but the opening of it is heavy on me. If you can't get more than \$15,000, let it go and I will give you \$5,000."

These letters evidence a proposal by the defendant and an acceptance by the plaintiff. The acceptance was of the whole of the terms of the proposal; for where one proposes to another a contract, it must be wholly accepted or rejected; it cannot be accepted with a difference of terms. An acceptance must be absolute and identical with the terms of the proposal. When, therefore, the plaintiff accepted the terms contained in the letters of the defendant, the letters constituted a binding executory contract between the parties, by the terms of which the plaintiff engaged himself as a special broker to sell the mine for defendant, with the measure of his brokerage or compensation fixed and agreed upon, reserving to the defendant himself the right to sell.

Within the scope and warrant of the terms of this contract the plaintiff had authority to sell, but

#### This Authority Was Limited

By the right reserved by the defendant. Under this right, the defendant, if he sold the mine, would not be liable to pay the plaintiff commissions; he undertook only to pay for a sale effected through the agency of the plaintiff.

This right existed in the defendant independent of the reservation of it in the contract; for a party who employs a broker to sell real estate, may, notwithstanding, negotiate a sale himself, and if he does so without any agency of this broker, he is not liable to him for commission. To earn his commission the broker must be an efficient agent in, or the procuring cause of the contract.

Now, the mine was actually sold to the person referred to in the pleadings, on or about the 20th of May, 1877, for \$20,000, \$5,000 of which were paid, and the balance was secured by a promissory note, payables in sight months, and the payment thereof secured by a mortgage upon the mine. But the plaintiff did not find the purchaser, nor make the sale, nor assist or co-operate in making it, nor was he the procuring cause of it. The defendant himself negotiated and completed it entirely independent of the plaintiff. It is true that there is some conflict in the testimony upon the subject, but it is not substantial. There is a great preponderance of the evidence in favor of the defendant. The plaintiff himself, in his testimony, says: "I have brought this action for money coming to me for his (the defendant) selling this mine. I expected the money if he sold this mine." He admits that he

#### Never Spoke to the Purchaser

About huying the mine, and that he was wholly unacquainted with the man until introduced to him by the defendant after this mine had been sold. "I knew Thomas," he says, "but was not acquainted with him until about the 12th or 14th of May, or along about there, when I had an introduction to him." Nor did he ever attempt to see him about purchasing, although he was well aware of the fact that the defendant had been, for several months, trying to negotiate with Thomas for a sale.

He says: "I did not go down to see Thomas to push this trade, because I thought I had other better parties than Mr. Thomas at this time—men who would give more." And he never claimed that he had anything whatever to do with the sale until after it had been negotiated and closed by defendant. After that he claimed that he had found Thomas as a purchaser, because he had written to the defendant to come down to the city and sell the mine to anyone who would buy. To this question, namely: "And you claim that you discovered Mr. Thomas as a purchaser of the mine; that it was through your efforts?"—he answered: "On the last, when a negotiation was made and the purchase closed, I claim that I did. I claim that I wrote for the defendant to come down to close the sale of this mine with any man that would give us the best terms." On the 1st of May he had written to the defendant that he had sold the mine, or was in a fair way to sell it, to a New York company for \$30,000, and he wrote: "You will either have to come down or send me a power of attorney when I notify you." But on the 14th of May he wrote again to the effect that nothing could be done: "You must come right away, and if we cannot sell it we will borrow some money upon it. \* \* \* I do not see any other thing for you to do than to come down to the city to make some arrangement, for I have no authority to do anything."

The Efforts to Sell to a New York Company Were made on the plaintiff's behalf by one with whom he had promised to divide his commission in case he effected a sale. But he said to him at the same time, "If we do not sell within a day or two or get some one interested in the property to examine it, Scanlan, (the defendant) will sell it to Mr. Thomas, and there is no commission in it for us."

The defendant, after these letters, came down to San Francisco, and finding that plaintiff had not and could not effect a sale, he resumed negotiations with Thomas and sold the mine to him. In these negotiations the plaintiff did not in any way participate.

Of course, if the plaintiff had found Thomas, as a purchaser, and brought him and the defendant together, or if he had told Thomas that the mine was for sale, and the defendant that Thomas wanted to buy, and if, under these circumstances, the defendant had taken the negotiation of sale into his own hands, and effected a sale, he could not refuse to pay the plaintiff the stipulated commission.

#### The Commission of a Broker is Earned

By finding a sufficient purchaser ready and willing to enter into a valid contract for the purchase upon the terms fixed by the owner, and having introduced such a one to the owner as a purchaser, he is not deprived of his right to commission by the owner negotiating the contract himself. But none of these things were done by the plaintiff.

Unquestionably the plaintiff, personally and jointly with a third party, expended some time and labor in trying to find a purchaser and to negotiate a sale, but his efforts were unsuccessful, and after the sale had been made by the defendant he rendered some services to the defendant by introducing him to a lawyer who supervised the papers of the sale which had been prepared by the attorney of the purchaser. But these services, rendered after the sale, were not "within the encompassment and drift" of the plaintiff's employment and none of the services which were rendered were assistant to this sale. Neither for them, nor for his unsuccessful efforts in finding a purchaser, is the plaintiff entitled to commission. The essence of his contract was the obtaining of a purchaser. The judgment and order of the lower court were reversed.



## California Mines.

We have been constantly calling the attention of miners to the fact that they will find as good mines in California as anywhere, and that, on the principle that the "hills look green afar off," they imagine that Arizona, Idaho or Alaska must be better places for miners than this State. California is producing somewhere about twenty millions of dollars a year from her mines. Although the first opened of the Pacific States and Territories, she is even yet second only in the list of bullion producers. Colorado for the first time eclipsed her last year. These are facts, which speak volumes for the California mines. Dozens of new camps are heralded abroad as going to produce millions, but the end of the year will tell the story.

If we had believed all the "yarns" we read last year about the various mining districts of Arizona, New Mexico and Colorado, and the comparisons which were made between them and "poor old California," we would have been convinced that any one of these camps would have produced more bullion than all Californian districts put together. But "coin talks," and at the end of the year California took its old place as second on the list, and showed an increase of over half a million production over the previous year. And this was done without any rush, or excitement, or extended advertising, or new railroads; and, in fact, in the face of adverse circumstances, a great deal of capital being invested elsewhere in newer regions, while comparatively little was put in here.

California can very well afford to move on her way quietly, open her new mines, and develop her old ones, take out the gold and turn it into "twenty's," and at the end of the year she can count dollars with some of the newer regions, about which there is more talk than corresponding results.

It is just as well for miners to think twice before going off on wild goose chases. They may find that what they are leaving at home is as good as what they are going after. The Virginia Enterprise of recent date refers to this in the following paragraph:

"Recently quite a number of nuggets of gold have been picked up in Butte county, California; were exposed on the surface of the ground by the action of heavy rains and high water. Had those nuggets been thus picked up in Alaska, or somewhere down in New Mexico, what a fever our prospectors would be in till they were off for the region in which they were found. Thus it would seem that even gold is not accorded its full meed of honor at home, when found in its native soil."

The Bodie Free Press has also something to say about California mines, as follows: "The papers published in many of the worked out mining camps of Nevada, are filled with information for their starved out readers as to how to reach Wood River. If energetic prospectors or enterprising capitalists desire to reach the richest and most continuously extensive mining region in America, let them take the stage or other conveyance at Carson City and keep going south till they get well into the mountains of Esmeralda county, Nev., or into Mono or Inyo counties in California. If they are in search of mines rich in gold and silver let them come to Aurora, Bodie, Jordan or Tioga; if they want mines rich in free gold, let them come to Bodie, or proceed to Homer, Beveridge, or other districts in Inyo, and if they want to find mines that are far richer in argentiferous and auriferous galena than anything yet shown in the Wood River country, let them go to Tarrytown and other districts in the vicinity of Deep Springs valley, a few miles south of Bodie."

**HIGH EXPLOSIVES.**—In this issue of the PRESS is given the first of a series of articles on "High Explosives," by E. M. Eiseler. These articles will be of interest not only to "powder men," but to miners. The subject is one which invites discussion, and those who differ with Mr. Eiseler's views are at liberty to present their objections to the same audience that he has. We shall be pleased to give space to a free discussion of the subject for the benefit of all concerned, so if any one has any thing to say which will add interest to the subject of "high explosives," we are ready to hear from him. The subject is one which only those persons who have made it a study can be familiar with, and the editors of this journal cannot undertake to endorse the statements of the various writers; but we will give all a fair opportunity for criticism or explanation, and hope all will contribute their quota of knowledge.

The first iron bridge built in Idaho has just been completed across Snake river at Blackfoot. It is composed of five spans, each 100 ft. in length, while on the east side is about 60 ft. of approach built of timber, and on the west side about 25 ft., making the entire bridge 585 ft. in length. There are six piers or cribs, which are built of heavy timbers 12 inches square and filled with rock, over 100 cords of rock being used for that purpose, the weight of the cribs being estimated at 75 to 125 tons each, besides the weight of the bridge.

## Academy of Sciences.

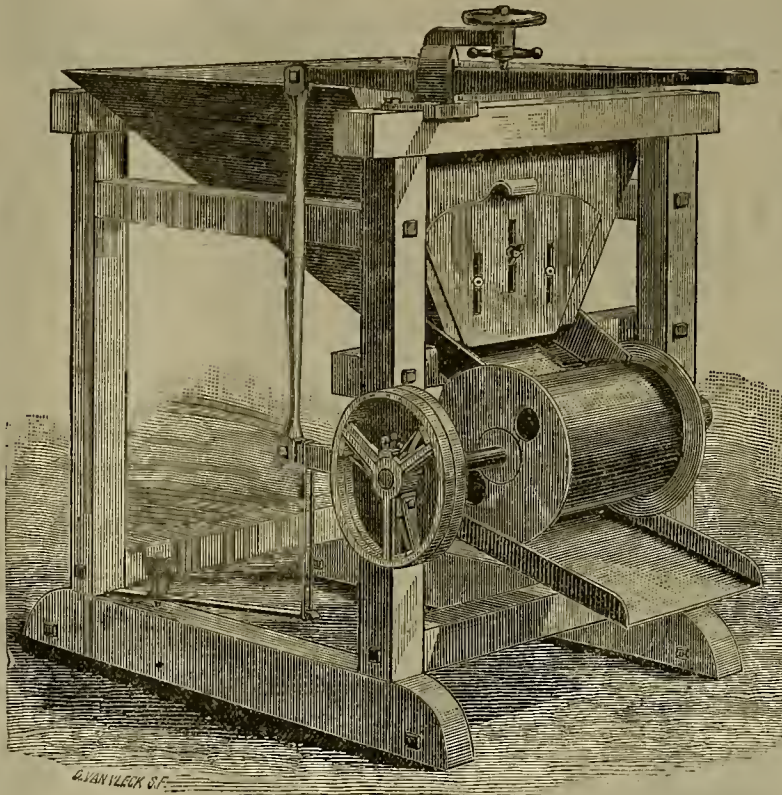
The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last. Vice President, J. P. Moore, in the chair.

Among donations to the museum was the corugated tooth of a hairy mammoth found among fossil remains on the southwest shore of Whidby island, Washington Territory, by Capt. J. S. Lawson, of the United States Coast Survey. There was also presented, by S. Ferraro, a sting-ray fish, about three inches in length, whose sting is very severe; by Dr. Arthur B. Stout, a Mexican water-bottle, manufactured of colored pottery with interesting figures, from the State of Jalisco; from Dr. H. Herman Behr, a species of *geophilus*, or centipede, found in Sonoma county, which, it is surmised, feeds on the phylloxera, and is thus a friend to vinticulturists; from W. H. J. Brooks, a large rat with a pouch on the side of his face, like those of gophers, and a bat from Bakersfield; from Captain Lund, a crab from Tahiti; from J. H. Clark, a variety of California wood-rat; from the Smithsonian Institute, a donation of 129 species of Pacific coast fishes; from Capt. R. W. Simpson, a spirally

## Metallurgy of Copper.

A metallurgical process of apparent importance to copper miners has been made by some manufacturers of Saint Etienne and Lyons, France. Everybody knows of the revolution effected in steel making by the Bessemer process. "Blow air into pig iron;" such was the original idea of that invention. That idea has been generalized. Some time ago, in England, it was tried to blow air into molten pyrites, or sulphides of copper, so that the sulphur could be got rid of and at the same time be used as a combustible. But, as it happened to Sir Henry Bessemer in the beginning, it was impossible to prevent the cooling of the bath at the end of the operation. Only by a mere accident a practical way has now been found to overcome this great obstacle.

A French correspondent of *Iron* describes this discovery as follows: Recently some old scraps of copper were to be melted in a copper foundry at Lyons. It happened that a small piece of phosphor-bronze was amongst them. The engineer present at the operation was much astonished when he noticed this particular piece of scrap becoming heated, under the influences



THE ROLLER ORE-FEEDER.

knotted cane of Port Orford cedar, with an enormous head composed of tuber excrescences that grow at its roots, the whole varnished and inscribed with a silver plate.

James V. Coleman and Joseph Grant were unanimously elected members of the Academy, and L. E. Blockman was proposed for resident membership.

A paper was then read, prepared by Captain De Bruno, of the Italian army, a gentleman who has been widely engaged in collecting archaeological specimens in the South Pacific islands, especially in New Guinea. Captain Bruno has unpacked a large archaeological and ethnological collection, and they were displayed at the hall of the Academy, where all parties especially interested are cordially invited to inspect them. His paper was in narrative form. Capt. De Bruno announced his intention of completing the reading of his very interesting paper at the next meeting of the Academy, on the 18th instant.

Vice-President J. P. Moore read a translation of Max Cornu's paper on applications of the germ theory to parasitic fungi and especially to diseases of the vine.

Dr. H. W. Harkness then presented a printed list describing 29 new kinds of Californian fungi, just published in London, as the result of his labors, and those of his associate, Mr. Cooke. The Vice-President said the work Dr. Harkness was so earnestly and faithfully carrying on, in discovering and classifying the fungi of this State injurious to vegetation, was a very laborious one, requiring all his time, which he cheerfully gives, with hard study and close scrutiny. It is destined to prove exceedingly valuable, and he is surely deserving of great credit for his skill and industry. Dr. Harkness then described a disastrous fungi that infests oak trees in our park and cemetery, which spreads its network over the oak leaves, producing death by depriving it of air to breathe, for leaves are the lungs of plants. These twigs die the second year when thus covered, and great numbers are now thus affected.

of oxidizing heat, to a far higher temperature than the other scraps, arriving at last at a bright white heat. In short, the phosphorus, by its combustion giving an enormous amount of caloric, melted the copper. By observing the order of combustion of the elements mixed with the pyrites, it was ascertained that the sulphur was consumed first, then some other element, and finally the phosphorus. The question was simply to add a small quantity of phosphorus in order to prolong the operation and obtain in the end good rose-copper. The result has been the formation of a company for treating copper in this way.

## The Roller Ore-Feeder.

We call the attention of our readers and patrons to the subjoined cut of an ore-feeder, one of which can be seen at the machine works of Joshua Hendy, No. 51 Fremont street, in this city. This feeder was patented June 24, 1873, and is called the "Roller" feeder.

Its important feature is that it is a carrier feeder, the ore being carried over a roller to the line of discharge, which is an essential element in the construction of any automatic ore-feeder. The spring attachment and grip, shown in the cut, are the equivalents of those introduced into the well-known Challenge, manufactured at the same works.

The adjustable gate is a check to prevent the ore passing from the hopper too freely over the roller. Those who are interested in the important matter of the proper feeding of ores to secure their perfect reduction are invited to examine the one in operation at the Machine Works, No. 51 Fremont street.

DURING the past few weeks rich strikes of carbonate ore have been made in the Cave Creek district, Arizona, which will yield as high as \$150 to the ton, and specimens have assayed as high as \$300.

## A New Home Industry.

The San Francisco Tool Co., of this city, a newly organized company, of whose products we expect to treat in future numbers of this journal, has commenced the manufacture of centrifugal pumps for low lifts, and especially adapted for purposes of irrigation and reclamation. These pumps are in many respects novel, as we shall presently explain, and their manufacture adds one more important item to our local industries.

During ten years past, especially since the improvements of the Gwynne's, of London, England, pumps of this class have been constantly gaining in economy of performance and in favor, until, at this time, it may be said that ecop wheels, Archimedesian screws, bucket chains and so on, have been abandoned and laid aside as crude and unreliable. This remark applies even to conservators Holland, where nearly all recently constructed pumping plants have consisted of centrifugal machines.

The most extensive experiment in low lift pumping thus far has been that of clearing the Ferrara marshes in northern Italy, where a marsh district of 200 square miles has been cleared of water and successfully maintained for cultivation. The amount of water raised almost surpasses comprehension, sometimes reaching 500,000 gallons a minute. If flowing in a stream at the rate of two miles an hour it would equal 100 ft. wide and 4 ft. deep.

The most astonishing matter, however, in connection with this vast and successful enterprise is the coefficient of effect. In the official trials in 1875, the fuel consumed was 4 lbs. for each horse power of water lifted. The pumps have now been in use seven years, and all that time have cost nothing except for fuel, oil, and attendance.

In Holland, there have been erected many large plants of a similar kind, some of them very extensive, and in all cases with an economy over the old primitive appliances, which "theoretically," "lost no power."

The pumps constructed by the San Francisco Tool Company are called Turbine, and the name suggests an analogy between the history of water-raising appliances and water-driven appliances. It is not so long since but that people now living can remember when the overshot water wheel was thought the most perfect among hydraulic motions, and this idea prevailed until Francis and Boyden's hydraulic experiments at Lowell, Mass., showed conclusively that Turbine wheels would and did utilize between 80 and 90% of the total gravity of the water. The Turbine water wheel has since then taken its place as the true scientific water motor for all heads within ordinary range; and centrifugal pumps, for the same reasons, are following in the same line. We are, of course, speaking of low lifts, and in cases where water power and water raising can be fairly compared. For deep lifts and high pressure, modern engineering, and especially California practice, is not likely to be much improved upon.

Land reclamation and irrigation are in the future to form subjects of great interest on this coast, and we venture the opinion that the San Francisco Tool Company have entered upon methods that will well suit the requirements.

Their pumps are called "Turbine," from the analogy to water wheels of that name, and they possess many features in common.

The "runners" are "many issued" and enclosed; are, in fact, Turbine wheels.

Instead of filling the casings as closely as possible, the usual method of constructing such pumps, a space of several inches is left between the sides of the "runners" and casing.

This space is filled with water, as it would be in any case, but the makers contend that the friction is much less when a considerable stratum of water is interposed between the surfaces.

The water-joints at the periphery are so arranged as to withstand grit and obstructions. There are no valves or crooked passages, after passing the foot-valve, which is supplied with and included in the price of each pump.

The parts are all strong and substantial, being nearly twice the weight of such pumps as have been hitherto imported.

All the parts are mounted on massive wooden frames, so as to avoid the necessity of foundations which are always expensive, and sometimes impossible on the tule lands.

The same arrangement permits the pumps to be erected on light, cheap barges, where *terra firma* is not available, and this method, if we mistake not, will be adopted in many cases. A cheap barge, or as it is called east of the mountains, a "flat boat," on which could be mounted a turbine pump, a steam engine and a supply of fuel, could no doubt in many cases be profitably employed in irrigating; serving not only one, but a dozen ranches, moving from one to the other alternately as occasion might require.

The company, in addition to their business of constructing machine tools, propose to make nine sizes of these pumps, the area of discharge and direction being from 25 to 400 inches. In cases where it is preferred the turbine pumps with a steam engine to drive them will be mounted on one frame of wood 30 to 40 ft. long, all being connected so as to avoid erecting foundations, and so on, which often cost more than the machinery itself. The address of the San Francisco Tool Co. is given in our advertising columns.



**JORDAN DISTRICT.**—The Bodie Free Press says: Jordan district lies along the mountains forming the western wall of Mono Lake valley, from the mouth of Mill Creek canyon northward to the old Mono placer diggings, and is distant from Bodie about 15 miles. The mountain, which is a portion of the main range of the Sierra and is contiguous and parallel to the summit, rises precipitously to a great height, while Castle peak, with its snowy cap, rears its conical crown above the clouds in the rear or to the westward. The mineral veins of Jordan district strike north and south along the eastern face of the great wall overlooking Mono valley and lake, crop one above the other from the base to the summit of the mountain, and generally pitch west into the hill. The formation near the base of the range is talcose slate, with decomposed porphyry, quartzite and spar toward the summit. A large creek sweeps along the base of the range, under the mineral belt, for several miles, while above the mountain is crowned with a thick growth of "hull pine," a yellow, brittle pine, and an abundance of smaller timber for fire wood.

**A MILE IN 58 SECONDS.**—The new fast locomotive, No. 10, just turned out at the shops at Altoona, was recently given a trial and did wonders. She was taken to Huntington and then started home. The distance of 34 miles was made in 44 minutes, but there was some time lost by a "green hock." One mile was run in 58 seconds and another in 59 seconds, and throughout the trip the engine behaved very well. It is a tremendous piece of mechanism, and, although finished very plainly, is well proportioned and pretty as a picture. There are many changes from the usual engine in this one. The endeavor has been to put all weight as low down as possible. The whistle is on top of the cab, the engine's reverse lever is worked by steam, and the sand-hox, instead of being near the dome, is in the sheathing covering the driving-wheel. A modoc looks like a pygmy alongside of this monster. It will be kept at Altoona for a few days, and run on regular trains until its capacity is tested.—Harrisburg Telegraph.

The La Plata mining and smelting company of Leadville has declared a dividend of 7½ cents per share, or \$15,000, payable at New York on the 1st. A surplus of \$54,000 will be carried over from this dividend, besides \$100,000 working capital.

LEADVILLE has now a stock exchange. Stocks are listed free, so they will no doubt have a pretty long list.

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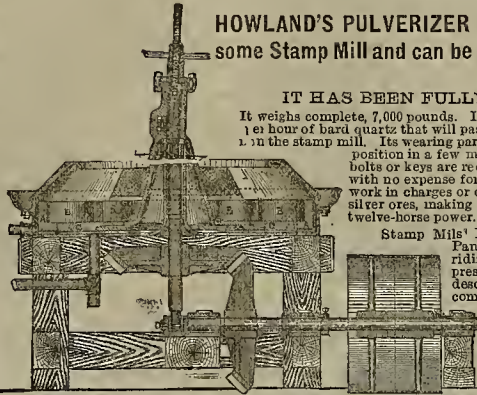
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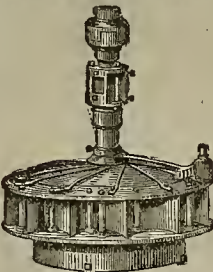
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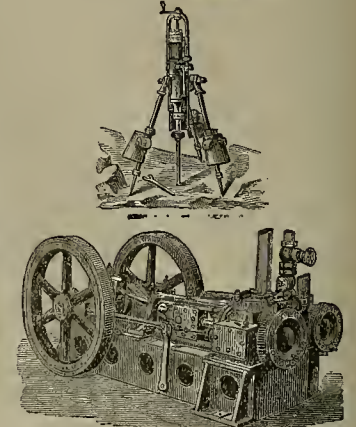
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rocks as easy as fine dirt, and will raise as much material as the water will carry off in a flume  
on 6 inches grade to 12 feet.No bedrock cuts, tunnels or drains required. Machine a sufficient drain itself, and the  
process of mining the same as any other hydraulic mine. Is now a practical success in various  
places in California and Oregon. Send for descriptive circular to**JOSHUA HENDY,**

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**ALEX. DEL MAR,****Mining Engineer,**Formerly Director of the Bureau of Statistics of the  
United States; Superintendent of the United States  
Special Commissioners of Mines; Member of the  
Committee on Mines at the Congress of Na-  
tions held in St. Petersburg, Russia;  
Mining Commissioner for the United  
States Monetary Commission;  
author of a History of the  
Precious Metals, etc.

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from 500 pounds to a ton of their ores, that I can save  
from 25 to 100 per cent. more than any other machinery  
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No. 143 Fremont Street.**M. B. DODGE.****COAL!****NOW DISCHARGING.**2,500 TONS Atlantic Cumberland,  
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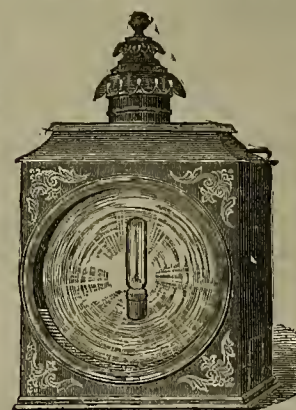
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ticles to be found in my store, to be had on application.Fink's Patent Silver Plated Corrugated Glass  
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Ventilating Churches, Halls, Stores, Etc.Patent Mill and Street Lamps to Burn Coal  
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Latest Improvements, making them the best and  
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highest state of perfection, are prepared to fill orders  
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DRILLS, with or without power, at short notice, and  
at reduced prices. Abundant testimony furnished  
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on this coast. Circulars forwarded, and full infor-  
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR WEEK ENDING MARCH 22, 1881.

239,216.—FESSER FOR THRESHING MACHINES.—T. S. Bayley, Orland, Cal.  
239,225.—BSAN CUTTER.—A. Flohr, Sacramento, Cal.  
9,616.—PANTALOONS.—Releuse.—R. Gibbons, S. F.  
239,249.—SULFUR PLOW.—F. A. Hill, San Leandro, Cal.  
239,253.—SPREADER FOR THRESHING.—B. Jackson, S. F.  
239,300.—TREATING ORRS.—A. Ryder, Oakland, Cal.  
239,333.—MONUMENT.—T. Wagner, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast Inventors transacted with perfect security and in the shortest possible time.

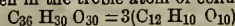
#### Gun Cotton.

[Written for the Press by E. ESSLER, Secretary of Union Powder Co.]

The transformation of cotton fabrics, paper and other forms of cellulose into explosive substances by the action of strong nitric acid was discovered by Pelouse in 1833, but Schonbein (in 1846) was the first to convert cotton wool into the explosive body known as gun cotton. Schonbein found that when ordinary cotton wool, well cleansed and carded, was steeped in a mixture of very strong sulphuric and nitric acids, the result was its transformation (almost without change of appearance) into the curious inflammable material now known as gun cotton. Soon after this discovery many researches were instituted into its nature, preparation by many continental chemists. Experiments were made on its application as a propelling and mining agent, and its manufacture upon a considerable scale was set on foot by Messrs. Hall, the well-known gun powder makers at Faversham, England. Unfortunately, however, a most disastrous explosion occurred at the works, and the manufacture of gun cotton on any considerable scale was consequently abandoned. This was in 1847, and from that time until 1854 little or nothing was added to the knowledge already possessed as to the nature and properties of the material. In that year Mr. Hadow published the results of some valuable experiments, which were as follows:

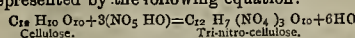
#### Chemical Constitution.

In the formation of substitution products by the action of nitric acid upon cotton or cellulose, three atoms of the latter appear to enter together into the chemical change, and the number of atoms of hydrogen replaced by peroxide of nitrogen in the triple atom of cellulose,



May be nine, eight, seven or six, according to the degree of concentration of the nitric acid employed. The highest of these substitution products is tri-nitro-cellulose, pyroxyline, or gun cotton.

This was the substance first produced by Pelouse in an impure condition in 1836, by the action of very concentrated nitric acid upon paper or fabrics of cotton or linen, and afterwards obtained in a pure form by Schonbein, who employed a mixture of concentrated nitric acid and sulphuric acids for the treatment of cotton wool; the object of the sulphuric acid being to abstract water of hydration from the nitric acid, and also to prevent the action of the nitric acid from being interfered with by the water which is produced, as the chemical transformation of the cotton into gun cotton proceeds. The formation of tri-nitro-cellulose is represented by the following equation:



The chief objections to gun cotton as first prepared by Schonbein are said to have been: First, its variable composition; second, its looseness of texture, which prevented its having the character of grains of gun powder, so that in its application for propelling purposes, one and the same degree of rapidity of combustion, must exist for every nature of fire arm, whether large or small; third, the dangerous character of its manufacture; fourth, the low temperature of its ignition; and fifth, the corrosive nature of the vapors evolved by it.

These and a few other disadvantages soon led to the abandonment of the manufacture of gun cotton in England, but in Austria experiments continued to be made from time to time, and in the last few years, Gen. Baron von Lenk, of the Austrian army, has succeeded in improving the manufacture of gun cotton to such an extent, that, according to the report of Austrian commissions, it is stated to possess all the advantages of Schonbein's original material without its corresponding defects. It is mainly owing to Baron von Lenk's efforts that gun cotton has taken any rank at all amongst the explosive materials, as without his improvements in the mode of manufacture, this article could never have been produced with any degree of safety or stability.

#### Manufacture.

The following is an outline of the process of manufacture of gun cotton as practiced by Von Lenk: The cotton, in the form of loose yarn of different sizes, made up into banks, is purified

from certain foreign vegetable substances, by treatment for a brief period with a weak solution of potash and subsequent washing. It is then suspended in a well ventilated hot air chamber until all moisture has been expelled, when it is transferred to air-tight boxes or jars, and at once removed to the dipping tank or vessel, where its saturation with the mixed acids is effected. The acids of the specific gravity prescribed by Schonbein are very intimately mixed in a suitable apparatus, in the proportion originally indicated by that chemist, i. e., three parts by weight of sulphuric acid to one of nitric acid. The mixture is always prepared some time before it is required, in order that it may become perfectly cool. The cotton is immersed in a bath of the mixed acids, one skein at a time, and stirred about for a few minutes until it has become thoroughly saturated with the acids; it is then transferred to a shelf in the dipping trough, where it is allowed to drain and slightly pressed to remove any large excess of acid, and is afterwards placed in an earthenware jar provided with a tightly fitting lid (which receives six or eight skeins weighing from two to four ounces each).

The cotton is lightly pressed down in the jar, and if there be not sufficient acid present just to cover the mass, a little more is added; the proportion of acid to be left in contact with the cotton being about 10½ lbs. to 1 lb. of the latter. The charged jars are set aside for 48 hours in a cool place, where, moreover, they are kept surrounded by water, to prevent the occurrence of any elevation of temperature and consequent destructive action of the acids upon the gun cotton. After 48 hours the excess of acid is removed from the gun cotton in a centrifugal machine. The cotton is now thoroughly washed in water, and then immersed in a rapid stream, where it is left for two or three weeks undisturbed.

It is then washed by hand, and immersed for a short time in a dilute boiling solution of potash. It is once more returned to the stream for a few days, then washed by hand, and finally dried by exposure to the air at a temperature of about 80° Fahrenheit. Mr. Abel has recently communicated to the Royal Society the results of very extensive and numerous experiments with gun cotton prepared at Waltham Abbey, at Stowmarket and in Austria, the results of which have fully established the character of gun cotton, when manufactured according to Von Lenk's process, and have explained the reasons why conflicting results were furnished by the earlier products of manufacture. He has, moreover, pointed out one or two very simple measures, the adoption of which he says insure the preservation with perfect safety of reserve stores of gun cotton. The weight of gun cotton required to produce equal effect either in heavy ordnance or in small arms, is to the weight of gunpowder in the proportion of one to three; so it seems that for equal weights, gun cotton would exert three times the force as compared with gunpowder; but regarding its cost of manufacture, it must be at least five times as high as gunpowder.

The general properties of gun cotton as an explosive agent are as follows: When raised to a temperature varying between 270° and 400° F., it burns with a bright flash and large body of flame unaccompanied by smoke, and leaves no appreciable residue. It is far more readily ignited by percussion than gunpowder. The products of its combustion in air render litmus paper powerfully; they contain a considerable proportion of nitric peroxide, and act rapidly and corrosively upon iron and gun metal. Its explosion in the loose carded condition resembles that of the fulminates in its violence and instantaneous character. In a confined space the effects of its explosion are highly destructive as compared with gunpowder, being as one to three, but strange to say the projectile force exerted by it in arms is comparatively small. Mechanical means have, therefore, to be resorted to for the purpose of modifying the rapidity of its decomposition, and it is with this object in view that Von Lenk manufactures the cotton into yarn of different sizes previous to its conversion into gun cotton. By winding, plaiting or twisting into rope these threads, or yarns, of gun cotton, he has to some extent succeeded in effecting modifications in the explosive effects of the material; but experiments instituted by the committee on gun cotton have shown that these modifications of the mechanical conditions of gun cotton do not serve to modify the rapidity of its explosion when under considerable pressure, as in the bore of a gun, sufficiently to reduce the action of the material to that of a safe propelling agent. Much more promising results have been obtained with a different system of mechanical treatment, which has been recently devised by Mr. Abel, and consists in reducing the gun cotton to fine pulp, by ordinary paper-making machinery (Hollander), and then converting it by pressure into uniform masses, the form, extent of surfaces exposed and density of which may be greatly varied.

This mode of working gun cotton affords the means of moderating its explosive action in other ways, namely, by intimately mixing the finely-divided gun cotton either with ordinary cotton, or other oxidizing salts, nitrate of potash, nitrate of barite, the latter composition known as tonite powder. Gun cotton and its mixtures are used to some extent in England, both for mining and sporting purposes, and is manufactured at Stowmarket.

Gun cotton would no doubt have played an important role in our mining industries had it not been for the discovery of nitro-glycerine, the properties of this substance being by far

superior to gun cotton when made into nitro-glycerine powders, called dynamite, which material, owing to its cheapness, superior strength and other advantages, has taken the first rank as a blasting agent, and wherever the question arose, gun cotton or nitro-glycerine powder? the preference was given to the latter.

#### Facts about Ore-Feeders.

EDITORS PRESS:—Since the publication in your issue of the 19th ult. of a communication from me relating to the adoption by Messrs. Parke & Lacy of the Climax ore-feeders, manufactured by Goss & Adams, of this city, as a part of the complement of the machinery and appliances of the so-called model silver mill, then being forwarded by them to Mexico for the North Mexico mining company; I have gathered certain credible information in regard to the adaptability of these feeders to the performance of their required work, which may be of interest to those of your readers who are engaged in mining enterprises, and contemplate the erection of quartz mills.

I have a written statement authorized by a gentleman who has had charge of two mining properties in Shasta county, viz.: the Extra and the After Thought; and also of one in Placer county, the Julian, in the mills belonging to which were eight of the well-known Challenge ore-feeders, and of which this gentleman writes "that they gave perfect satisfaction, resembling a thinking machine." He subsequently assumed the management of the Yosemite mining company, of Mariposa county, in the 30-stamp mill belonging to which were six of the Climax feeders, and of which he says "that after a fair run and trial of their capacity, they were rejected as utterly useless," and recommended their replacement by the Challenge; his experience having taught him that they (the Challenge) are superior, in every particular, to all others. From another gentleman, the manager of the Harmon gold and silver mining company of Placer county, I further learn that in the construction of the mill for the reduction of the ores from this company's mine, that two of the Climax feeders were introduced, and that the machinery not running satisfactorily he employed one of the best millwrights in the State to overhaul it, and that this millwright endeavored, by every mechanical means known to him, to make these feeders do their proper amount of work, but after a series of trials he became discouraged and they were rejected, being unfit to perform their intended purposes; and the manager offers \$100 to any person who will put through one of those feeders (Climax) one ton of rock in a satisfactory, automatic ore-feeding manner.

I have been further informed that two of these feeders were fitted in the Oro Blanco mill of southwestern Arizona, but after a long and tedious trial of them, they were found to do their work very unsatisfactorily, and were pronounced incompetent to perform their required service.

These instances, the truth of which can be verified, it seems to me should be sufficient to cause those who intend to engage in mining, and contemplate the erection of mills adapted to the treatment of gold and silver ores, to hesitate before purchasing feeders of such an unfit pattern as these have proved to be; and I can conceive that their only recommendation is their "low price," which, in the instances given above, has ultimately resulted in being a "very high price," and to this fact alone can I attribute their introduction by mill contractors into any mill, as their adoption is certain to entail not only considerable expense, but important loss of time in experimenting with a thing which will ultimately have to be consigned to the "old iron" pile.

R. B. NOYES.

San Francisco, April 6, 1881.

EXPERTS AND PROSPECTORS.—Sam Curtis has been experiencing some old things in the way of lying by prospecting chaps. He complained to the *Enterprise* recently that he had been bilked into a trip to the Walker river country. A mine there had been bonded by a prospector to San Francisco men. According to the man's story, he had on his dump 1,000 tons of ore that would assay \$80 per ton, an immense lode and plenty of the same kind of ore in sight in all directions. The fellow stuck to this story all the way up from San Francisco and out to the mine. Even when at the terminus of the Carson and Colorado railroad, he assured the Colonel that the mine was all right. "Indeed," said he, "it is 50% better than I have represented it." When the mine was finally reached the ore on the dump did not amount to three wheelbarrow loads. The vein had been cut through and showed nothing, and no such work was to be seen as described. Col. Oshtion made a wild-goose chase out into the eastern part of the State. He told his man in the start that he hoped he was giving a truthful account of his mine; that it would be useless for him to lie about it and cause him to spend time and money in going to inspect his property. The fellow stoutly asserted that all he had said was true and not the half had yet been told, yet he found about such a mine as did Col. Curtis. If prospectors expect to get credit for what they really have, they should give a fair and square account of their property.

#### News in Brief.

THE electric light has been tried with success in London.

A CARLOAD of asparagus has been shipped to Chicago from Sacramento.

THE Spanish papers warn the Mexicans that they will soon be Americanized.

THE British revenue returns show an increase of \$2,776,233 for the past year.

THE plague is diminishing in Nedjeff, but has appeared at Maragala, in northern Persia.

PREPARATIONS are being made to rebuild the United States fishery on the McLeod river.

THE French Chamber of Deputies has voted 6,000,000 francs to indemnify the sufferers by the coup d'état in 1851.

NEARLY \$50,000 of stock has been subscribed towards the building of the proposed railroad from Santa Rosa to Benicia.

AN iron steamer is soon to be built for use on Lake Tahoe, towing logs. The material is now on the way from the East for her construction.

EX-GOVERNOR PACHECO, member of Congress from this State, is now in the city of Mexico, looking after the interests of the Topolomampo R. R. Co.

The Massachusetts House of Representatives have struck out of the prohibitory bill the section referring it to the people and then defeated the bill itself.

NEARLY 3,000 men are in the employ of the workers. Some 500 odd are employed near and Railroad Co. in San Diego county including all at National City.

Severe gales and floods have occurred on the Spanish coast of the Mediterranean. There has been considerable destruction of property in the province of Andalusia.

We know a man, says the *Republican*, a citizen of Santa Rosa, who can teach mathematics and Latin, at work in the woolen mill. He is not "waiting for something to turn up."

THE Denver and New Orleans Railway Co. have closed contracts for 12,000 tons of English steel rails, sufficient to extend the road from Denver to 10 miles south of Arkansas.

THUS far in the present calendar year the United States has received over five times as much specie from Europe as last year, gold receipts being about 12 times as large as a year ago.

THE new Governor of the State of Mexico has thrown obstacles in the way of the prosecution of work on the Sullivan & Palmer railroad. It is reported that 600 laborers have been discharged.

THE indications are favorable to a resumption of travel on the California Pacific railroad in about two weeks, and it is expected trains between Sacramento and San Francisco will resume running on the route about the 15th of April.

DURING March License Collector Sinton collected \$29,725.65 for licenses, as follows: General fund, \$24,624; municipal general fund, \$1,872; street department fund, \$1,392.25; special fee fund, \$1,892, and stock certificate transfer tax, \$540.

#### Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORN—San Francisco.  
A. C. KNOX—Pacific Coast.  
G. W. McGRW—Santa Clara county.  
M. P. OWEN—Santa Cruz county.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
N. E. BOND—San Bernardino Co.  
JAS. C. HOAG—California.  
E. W. CROWELL—Colusa and Yolo counties.  
B. W. KELLISER—Fresno, San Benito, Monterey and San Luis Obispo counties.

#### Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omission of agents.

#### Various Causes—

Advancing years, care, sickness, disappointment, and hereditary predisposition—all operate to thin the hair gray, and either of them inclines it to shed prematurely. AYER'S HAIR VIGOR will restore faded or gray, light or red hair to a rich brown or deep black, as may be desired. It softens and cleanses the scalp, giving it a healthy action. It removes and cures dandruff and humors. By its use falling hair is checked, and a new growth will be produced in all cases where the follicles are not destroyed or the glands decayed. Its effects are beautifully shown on brash, weak, or sickly hair, on which a few applications will produce the gloss and freshness of youth. Harmless and sure in its operation, it is incomparable as a dressing, and is especially valued for the soft luster and richness of tone it imparts. It contains neither oil nor dye, and will not soil or color white cambric; yet it lasts long on the hair, and keeps it fresh and vigorous.

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INVENTORS, and others interested, will receive DEWEY & CO.'S MINING AND SCIENTIFIC PRESS PATENT AGENCY Circular free on application at this office. It contains 42 pages of hints and information about Patents, Patent Laws, Patent Office Regulations, and how to obtain valid patents.

THE State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M., daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.



IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sealions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, APRIL 2, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, dividend No. Twenty-seven (27), of Seventy-five (75) Cents per share, was declared, payable on TUESDAY, April Twelfth, (12) 1881, at the office in this city, or at the Agency of The Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.

Office—Room No. 29, Nevada Block, No. 300 Montgomery Street, San Francisco, Cal.

### NOTICE.

Annual Meeting of Stockholders for the Election of Directors.

Notice is hereby given, that a meeting of the Stockholders of the REPUBLIC MINING COMPANY will be held in accordance with the By-laws of said Company, at the office of said Company, Room 25, No. 310 Pine Street, in the City and County of San Francisco, California, on TUESDAY, the Nineteenth (19) day of April, A. D. 1881, at one o'clock P. M., of said day, for the Annual Election of Directors, and the transaction of such other business as may properly come before the meeting. Transfer books will be closed on Friday, the Fifteenth (15) day of April, 1881, at three o'clock P. M.

WM. J. TAYLOR,

Secretary of the Republic Mining Company.  
Office—Room 25, No. 310 Pine Street, San Francisco, California.

**Lewis Consolidated Silver Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Twenty-third (23) day of March, 1881, an assessment, No. Four (4) of Six (6) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. Gold Coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Second (2) day of May, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Twenty-third day of May, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. FEW, Sec'y.

Office, No. 310 Pine Street, Room 15, San Francisco, Cal.

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Mission Street, opposite Woodward's Gardens; Branch, 1029 Sutter St. These Gardens have been Newly Stocked with a First-class assortment of the very best and most select plants for Conservatories or Open Grounds.

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Bouquets, Funeral Works and Cut Flowers furnished at short notice.

J. POUYAL, Proprietor.

All are invited to examine our stock.

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Mining Engineer.

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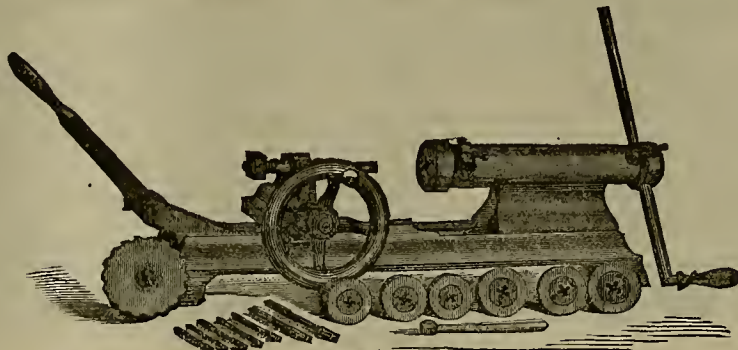
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D, " 53 " " 6 " " " "  $\frac{3}{8}$  to 1  $\frac{1}{2}$  "

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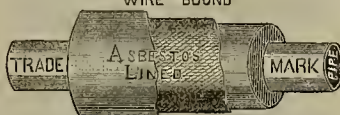
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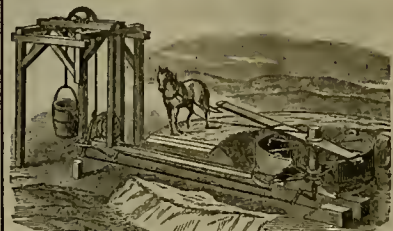
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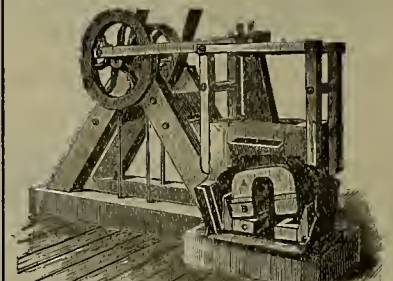
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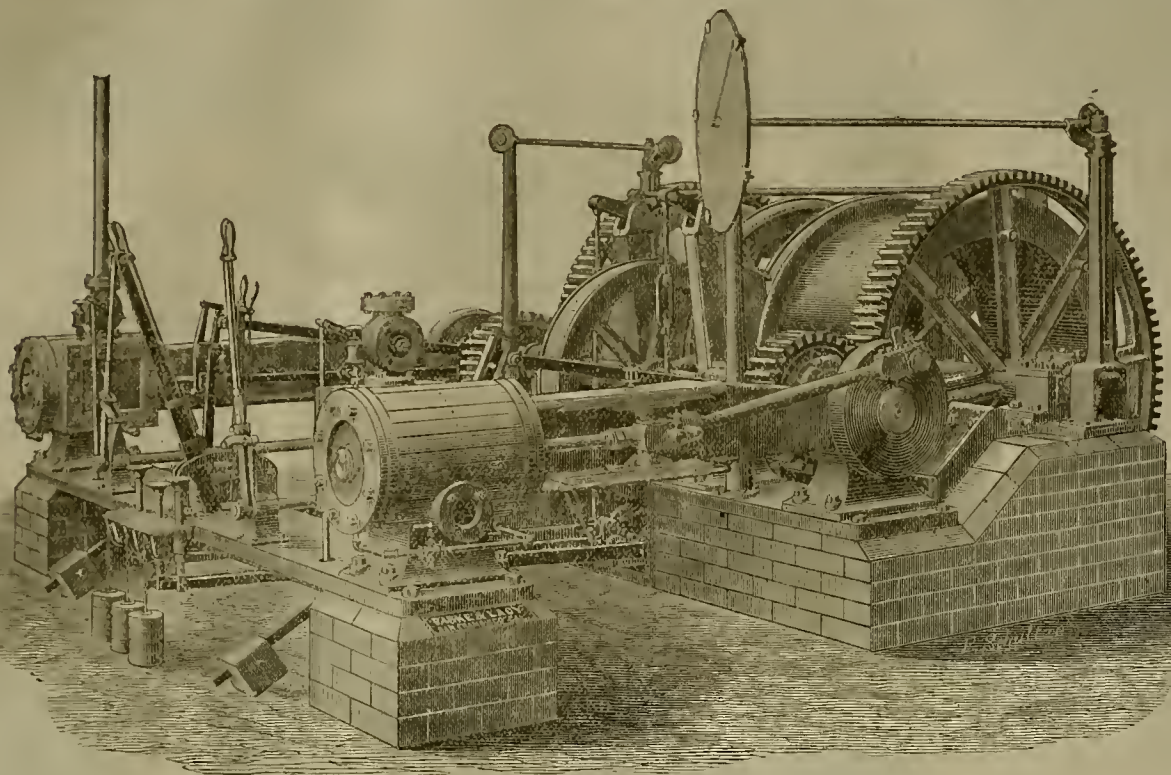


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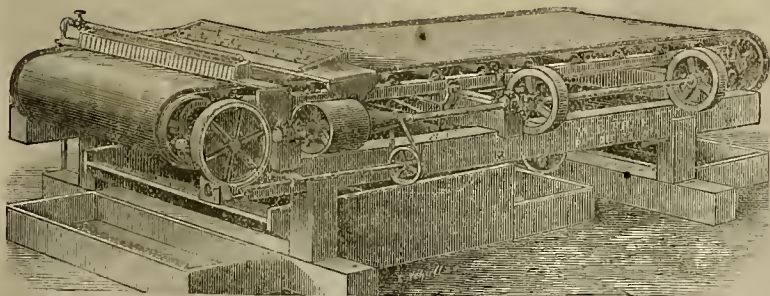
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Julian.....	20			Placer
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Providence.....	20			Nevada
Omaha.....	10			"
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Plumas-Eureka.....	60			"
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Four of the "Victor" Feeders, manufactured by E. T. Steen, were also placed in the "Alexander" Mill, at Grantsville, Nevada, but after a fair trial were discarded, and Henry's Feeders fitted, and four others of the same pattern added when the second twenty stamps were erected.

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# MINING AND SCIENTIFIC PRESS.

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## Electro Metallurgy.

[Written for the Press by G. KORTL.]

### Gold and Silver Anodes for Plating.

The quicker or slower transfer of gold or silver from the anode to the object to be plated, depends greatly on the density of the metals used as anodes. It may not always be considered an advantage if a thick deposit is obtained in a short time, employing a strong electric current and if the articles have to be furnished, but fancy articles of all kinds and such as do not require furnishing will admit of a speedy plating advantageously, and if an anode of lesser density is employed and the plating should go too fast, one battery may be used in place of two or more.

In order to illustrate the very different results obtained from differently prepared anodes, I will state the following experiment: I took two copper plates, of exactly the same area, both carefully weighed, and two silver anodes, both of them having also same area. The one consisted of rolled silver plate, the other was prepared porous. Over two vessels containing the bath, two copper rods were placed parallel, all conditions alike. In the first vessel opposite the copper plate was suspended the rolled silver, in the other the porous. The connection with the battery and the rods has been fixed in the middle between the two vessels. After three hours the battery was disconnected, and the two copper plates, after washing and drying, weighed. The plate from opposite the porous anode had five times as much deposited silver as the other plate, firmly adhering in both cases. This shows plainly that the density of the anode has a great influence on the solving property of the galvanic action.

The porous anodes of gold and silver are easily prepared; moreover, with reference to silver, it has the advantage that base silver hullion can be used for this purpose. The silver (granulated) is dissolved in nitric acid. Antimony, if present, remains undissolved. A drop of sulphuric acid added to the solution will indicate lead by producing a white precipitate, and in this case the acid must be added in small portions till all lead is precipitated. The copper remains in solution with the silver. The liquid is then diluted with distilled, or rain water and filtered. Into the clear filtered solution is now introduced muriatic acid or a solution of common salt, and by this the silver is precipitated as a white mass, which is filtered again and washed with water till all acid and copper is carried out. The precipitated silver (chloride of silver) is placed, while wet, in a porcelain or enameled iron vessel, diluted with water to a pulp, added a little sulphuric acid and metallic zinc (pieces of zinc sheet) and stirred from time to time. The white precipitate commences immediately to turn gray where it is in contact with zinc, and by degrees the whole mass appears lead gray, being now in metallic condition. The operation is finished when no white particle of chloride of silver is perceived. The finely divided metallic silver is placed into a filter and washed so long till all dissolved zinc is carried out, and in order to be sure that there is no chloride of silver among the metallic, the washing may be finished with ammonia. The silver is now pure enough for use. Upon a planed board a piece of linen cloth is laid, and on this the silver spread from one-quarter to one-half inch or more, according to the size needed, then covered with another like cloth, and finally with a board. The water is then pressed out from between the boards, and the silver plate allowed to dry after the upper board is removed. When dry, the plate is made red hot without having removed the cloth, which burns up. It is now ready to be used as an anode. If the silver with the cloth is glowing between two iron or earthen plates, it presents a nice, smooth plate, otherwise it becomes uneven.

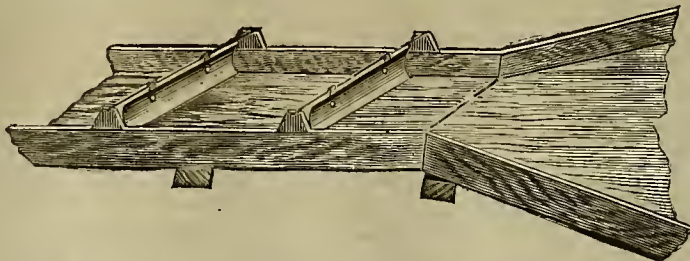
The gold anode is made by dissolving gold in "aqua regia" (nitric and muriatic acid) and precipitated with a filtered solution of sulphate of iron as metallic gold, which, after being washed with warm water, is spread on the cloth and pressed like the silver above described.

So-called refractory ores in many districts are being handled better each year.

## Swinging Plates for Float Gold.

Not long since we described in these columns the swinging plates for saving float gold, made by Geo. M. Lederer & Co., of the Bay City Plating Works in this city. The engraving given on this page, will show the arrangement of the plates in a sluice clearly. The amalgamating plates are silver plated first, the same as the ordinary plates in use in quartz mills.

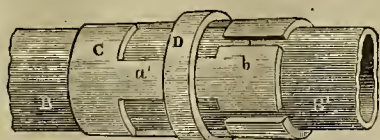
The swinging plate consists of a curved strip of silver-plated amalgamated plate, about three inches deep, and the width of the sluice or flume in which it is to be used. It is swung on eyes, through which passes a wire rod, resting on the edges of the sluice. The plate thus hangs transversely to the current, with its concave face up stream, the plate being half sub-



SWINGING AMALGAMATING PLATES FOR SAVING FLOAT GOLD.

merged. The movement of the water will keep the plate swinging. The floating particles of gold cannot escape touching the plate, and are caught on the quicksilver surfaces.

It is found in practice that across the sluice, immediately under each swinging plate, is formed a line of amalgam, which has dropped from the plate as it accumulated. The gold which is caught on the plates is thus saved. These plates are hung in sluices, a few feet apart. Very wide ones have been made for the sluices of hydraulic mines. The plates



KENDALL'S HOSE COUPLING.

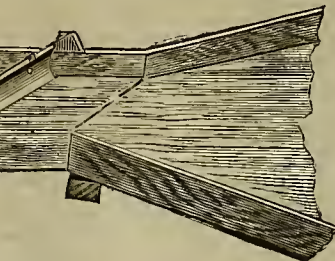
cost so little, and are so effective, that they have come into extensive use in a very short time.

PAST AND FUTURE OF THE COMSTOCK. — During the past 20 years, says the *Enterprise*, the Comstock vein has given 16 bonanzas, from which 6,500,000 tons of ore have been extracted. The average assay of this large mass was \$56 per ton; it yielded in the mill \$41.80; and from the treatment of sluices \$5; total, \$46.80 per ton. The total value of the ore extracted was \$363,671,605, yielding a net sum from the mills and sluices of \$323,671,605. The average proportion of precious metals in value is 45% gold, and 55% silver. Let it not be supposed that there is nothing more down toward where all this came from. We have the same old vein—wider and stronger than ever—and the present barren belt cannot last forever. As we cannot always remain in "bonanza," so it is not likely that we shall always remain in "horrasca." From three mines which do not consider that they are doing anything more than picking up what comes in their way, we last evening shipped the snug little sum of \$109,535.15.

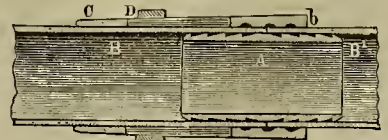
A USE FOR MINING BOATS. — The Gridley, (Butte county) *Herald* says: During the high water of last winter a mining boat was floated onto the ranch of N. Wilson, where it is now resting on dry land. The vessel is estimated to contain about 200,000 ft. of lumber, much of which can be used for building purposes. It is not known from what property the craft came, but there is a general belief that it is one of the renowned Henrietta experiments.

## An Improved Hose Coupling.

David B. Kendall, of Howland Flat, Sierra county, California, has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improved hose coupling, which we illustrate on this page. The invention consists in the employment of a metallic fastener formed by attaching strips of metal to a ring, so that the whole will form a series of elastic tapering clamps, surrounding the hose at its joint, said fastener being capable of compression by a circular hand, which slips over it. It consists, further, in supporting the inside of the hose, at its joint, by a short piece of pipe, the pieces of hose fitting over it, the said interior pipe being combined with a certain construction of exterior compressing devices.



In the engraving B represents one piece of hose, and A another. An end of each fits over the pipe C. The outside fastener is formed by the ring D, to which are riveted strips of metal, A' A', having a shank, and a wide head or holder, b, curved as shown, to fit the circumference of the hose, the joint of which is made to come about the middle of the heads. The inner surfaces of the heads, b, are grooved, so as to form slight ridges, or corrugations, or teeth, for the purpose of securing a firmer gripe upon the hose. The heads, b, of the strips, A', are not



KENDALL'S HOSE COUPLING.

wide enough to have their edges meet. They thus form an incomplete cylinder.

The device is slipped over the hose so that the heads, b, shall cover the joint therein, and, on account of the heads being thicker than the shanks which connect them with the ring, the whole device is tapering, being larger at the head than at the ring.

The strips A', act as springs, which allow the segmental heads to be compressed when the ring or hand D, is slipped upon it.

The hand D is a transverse section of a cone, in order to fit the shape of the fastening device and act as a holder, which, when pushed up toward the heads b, compresses them, so that their grooved inner surfaces are pressed against the hose. The inner pipe, A, resists the compression, and thus the ends of the hose are held firmly between them.

The device is a very simple one and is inexpensive. The inventor may be addressed for further information.

NON-ASSESSMENT. — The New York *Bullion* is beginning to realize the situation in regard to assessing mines. There is no disguising the fact that mining companies organized under the laws of this State are hampered by the provisions regarding the non-assessment of stockholders. Presumably for the benefit of the stockholder, the law is really a menace to his interest. The list is a long one of mines shut down and the money previously invested absolutely lost, because of the inability of the owners to assess themselves to develop properties demonstrated to be worth developing.

## The Sutro Tunnel.

At the annual meeting of the Sutro Tunnel company, held last week, the following Directors were selected: Charles M. Brush, President; Wm. Irvin, Vice-President; F. F. Low, David Cahn, Hugh Marshall, Wm. Johns and Joseph Aaron; Treasurer, Lazard Freres; Secretary, Pslham W. Ames; Superintendent, C. C. Thomas.

The Superintendent's report states that 2,149 ft. were made on the north lateral tunnel, and 1,903 ft. on the south lateral tunnel, during the year, with the details of the work performed in all its parts. He also refers to the low-grade ores still remaining in the different mines on the Comstock lode, which can be worked to a profit, which, he says, would not only be a vast industry by itself, but would afford new opportunities for developing new bodies of ore. He thinks that the facilities for cheap mining and transportation now afforded by the Sutro tunnel and its branches are matters of paramount importance to the company and to the mine owners of the Comstock lode. He also decidedly recommends prospecting along the line of the Brunswick lode, which he says is traceable on the surface, by well-defined croppings, a distance of two and a half miles, and which he says has never been prospected at the depth of the tunnel level. From two small drifts on that lode from the main tunnel, ore was taken assaying \$10 to \$30 per ton. Ore from this lode, now being extracted from near the surface, is paying an average of \$12.93 per ton, as appears from returns to the Assessor. The tunnel is now in his order to improve and develop this lode at a minimum expense, and as there is every indication that this vein contains paying ore—to what extent can only be ascertained by development—he recommends that work upon that portion of it owned by this company should be commenced as soon as practicable. He also recommends continuing the main tunnel into Mt. Davidson by a prospecting drift 2,000 ft. in length, as in his opinion, "the indications on or near the surface of the Mt. Davidson warrant further explorations in this direction," in support of which recommendation he cites the opinion of Prof. Church, expressed in his recent report on the Comstock lode.

NEW GEYSERS IN MONTANA. — According to the *North Montana River Press*, two new geysers have appeared in a strip of that Territory known as "Sag." The first was seen about a month ago, but has only lately assumed remarkable proportions. It is situated in a small canyon running out from the wall of rocks on the east of Alkali lake, and throws up a jet of hot water and steam over 100 ft. high. The height of the other geyser is only 50 ft, but the diameter of the spout is larger. The geysers are, of course, intermittent, and seem specially active in the morning. The formation of the country is a sandstone and gneiss, and has all the appearance of being an ancient river bed.

THE Chicago *Tribune* interviews of the 11th establish the fact that the wages of mechanics, artisans and day laborers will be 20% higher the coming season than last season, and the price of building material 10% higher. Nevertheless, there promises to be great activity in building. A thousand people per month are coming to Chicago from immigration alone, and the demand for house room and business sites is constantly growing, more especially in the suburban towns, where building is very lively.

ALASKA MINES. — The *Tribune's* Washington special says: Major Morris, who is now in Washington, is endeavoring to secure the establishment of regular mail service between Sitka and the new mining districts. He visited Alaska last fall, and says that among the valuable discoveries made while he was there was a rich silver mine on an island near the mainland, not far from the Harris district.

THE Indian Queen M. and M. Co. of Esmeralda county, Nev., has paid dividends since the 5th of January, 1881, to date, of \$20,000, and on the 7th inst. declared one of \$6,250, payable on the 20th inst. Shipments of hullion from March 22d to April 4th, amounting to \$8,800, have been made.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EBS

### Silver in Sedimentary Rocks.

EDITORS PRESS:—You published in your issue of February 19th a paper on the occurrence of silver in sedimentary rocks, which I had read at a January meeting of the California Academy of Sciences. In that paper I criticised the views advanced by Prof. Newberry of Columbia College, concerning the origin of the Silver Reef sandstone deposits in Utah. Since his original brief statement in the *Engineering and Mining Journal* of New York for October 23, 1880, Prof. Newberry has stated his views more in detail in a letter to the same journal. I am exceedingly sorry that the latter statement came to my notice too late to be considered in the same issue of the PRESS containing my original paper. With your permission, however, I will reproduce here Prof. Newberry's theory, and state the objections which I think may fairly be made to it.

Prof. Newberry says: "Anyone who has a little knowledge of chemistry and geology, and who will travel over the area underlain by triassic rocks in the West, will have no difficulty in grasping the true theory of the deposit of silver and copper in them. Thirty of the elements have already been found in solution in sea water, and among these are gold, silver, copper, lead, zinc, iron, manganese, arsenic and other metals. The triassic sea, as we know, covered a large part of the western half of the continent; but in central Utah it had a strongly marked ebb line, and thence to the Mississippi was shallow and to a large extent circumscribed by land. This shallow sea was, however, swept by currents which gave to the sediment it deposited a strongly marked cross-hedding, while chemical agencies were in action, which produced equally striking results.

"Over large areas, water basins were evaporated, causing the precipitation of great quantities of gypsum and salt. These conditions were decidedly unfavorable to animal or vegetable, and as a consequence throughout the area under consideration, there are no limestones in the trias, and the sandstones are almost always barren of fossils, and therefore are red in color.

"Near the Utah shore of this basin, the water would seem to have been more highly charged with silver than elsewhere, though it was also the associate of the more abundant copper in New Mexico, the Indian Territory and Texas. Doubtless this silver was brought up in springs on the old land from the same sources which furnished so large an amount of silver to the fissure veins formed there long after.

"Near the old shore the driftwood brought down by the draining streams and scattered by the shore waves, when hurried in the accumulating sediment, became more or less replaced by copper and silver precipitated by the reducing action of organic matter, which is manifested in so many different ways. The quantity of silver in some of the bays and estuaries carried by draining streams, perhaps fed in part by mineral springs, may have been greater than that in most parts of the water-basin, and hence the sediments formed there hold a quantity larger than the average. We find the same variation in the distribution of copper farther east. In some places it was so abundant that it was not all taken up by the decaying wood, but formed concretions of sulphides in the sand or clay. \* \* \* the ores of silver and copper plainly existed as solutions, which saturated the sand when it was collected, and deposited the sulphides with sandstone after the mechanical action which transported the sediment was at an end. All this, however, was within the triassic age, while the water was shallow and highly charged with mineral matters. Afterward the sea deepened, and 500 ft. of limestone were in the jurassic age, spread over the triassic sediments. Neither then nor during the following cretaceous age—when 2,000 ft. of strata, like the jurassic, free from copper and silver were deposited—could the impregnation of the triassic rocks have taken place. Later (in the tertiary age) when the foundations of all of this country were broken up, and fissures were opened from which issued steam and hot water carrying mineral matters that were deposited in every receptacle open to receive them, it is possible, though I think not probable, that in some places the porous sandstones of the trias were penetrated by solutions from which the sulphides of copper and silver were precipitated. That there has been some recent change of position in the silver contained in the sandstones seems proved by the accumulation of chloride in the cracks and joints which are of modern date.

"If these incrustations should prove to be confined to the most disturbed districts like Silver Reef, it would be an argument in favor of the modern impregnation of the porous portions of the sandstones; but it would not account for the replacement particle by particle of wood tissue, by the sulphides of silver and copper. Yet we know that all porous rocks which lie beneath the surface are traversed by mineral solutions, which frequently produce important changes, such as the conversion of a vesicular

trap into an amygdaloid by the filling of the closed cavities with silica or zeolites."

It would appear from the foregoing that the initial point with Prof. Newberry, in the formation of his theory is the occurrence of vegetable remains partially or wholly converted into sulphides of silver and copper; for evidently if the reduction of these metallic sulphides out of solutions could be effected only by fresh vegetable tissue, then the impregnation of the sandstones must have been simultaneous with their formation, and the most probable method of this impregnation, is that so plainly set forth by Prof. Newberry.

If however it can be shown that the organic remains of the triassic sandstone could effect this reduction long after their original deposition (as late even as the tertiary) we should not then be compelled to resort to the unusual assumption that silver and copper springs have emptied their highly charged mineral solution into the surface drainage of the country, a phenomenon that is never witnessed at the present day. With the exception of the occurrence of the mineralized organic remains, Prof. Newberry himself concedes the possibility (but not probability) of explaining the phenomena at Silver Reef according to the theory which I have previously advocated.

Now, Prof. Newberry's objection can be removed, and the phenomenon in question explained, by the not improbable assumption that from the time of their original deposition in triassic times until the advent of the mineral solutions in tertiary times, the plant remains were preserved in a state of imperfect lignitization, in which condition they would still largely retain their power of reducing metallic sulphides from solution, with the preservation of all the details of organic structure now observable upon the fossils.

After reading my original paper, in thinking further on the subject, Prof. Newberry's theory occurred to me. In fact, it is substantially the same as that proposed by Von Cotta for the Mansfeld Kupferschiefer in Germany, and by Murchison for the copper deposits in sedimentary rocks, in the government of Perm on the west flank of the Ural mountains. (*Erdlagerstätten II*, 110, 551.) I reject it, however, because it did not explain the apparent connection, insisted on by Rolker, between the eruptive rocks and the larger concentrations of ore in the sandstone at Silver Reef and Virgin City, in Utah, and at the Nacimiento mountains in New Mexico. It will be observed that Prof. Newberry explains these local concentrations by supposing them to be formed in estuaries, receiving streams fed by mineral springs. According to this view, the connection between the igneous rocks and the larger aggregations of ore is a purely accidental one; according to my theory it is a genetic one.

It will be observed that throughout my paper, I spoke with great caution, for I was discussing observations that had not been made by myself, and for the correctness of which I was compelled to depend upon others. If the observations are imperfect, or not sufficiently extensive, then the conclusions to which they lead may be false. For instance, if, contrary to the explicit statement of Supt. Rolker, large concentrations of ore should be discovered at long distances removed from massive rocks, other conditions likewise being favorable, I should at once be inclined to accept the theory advocated by Prof. Newberry, the foundations for which theory were so admirably laid by the exhaustive investigations of *Dieula fail* (*Annales de Chimie et de Physique*, 1879; Vol. xviii, p. 349). Furthermore, if it should be confirmed that the triassic sandstone of Utah and New Mexico are homogeneously impregnated with a very small amount of copper over very extensive areas, I should be inclined to believe that the impregnation of the sandstones was simultaneous with their formation and effected by precipitation from shallow inland seas, such as certainly existed over this area in triassic times. But I certainly do not believe that it has as yet been established that the Silver Reef or the Nacimiento mountain deposits are of simultaneous formation with the enclosing sandstones.

In conclusion allow me to remark that I do not class Prof. Newberry among the "hasty theorists" and "average modern investigators" mentioned in my paper; for there are few geologists in whose scientific work I have more confidence than in his. A. W. JACKSON.

Museum of Economic Geology,  
University of California.

### San Francisco and Pine Grove District, Utah.

[From our traveling correspondent.]

EDITORS PRESS:—In my last letter I gave a description of the great Horn Silver mine, which is one of the most extensive in this Territory. Following this ledge where it ascends San Francisco mountain N. 20° W., and at a distance of one and a half miles from its working shaft, the original formation of trachyte on the east and limestone on the west changes to granite and porphyry on the east and metamorphic sandstone, or, as it is commonly called, quartzite, on the west side of the ledge. Here we find a large outcropping of copper ore, about 35 ft. wide, which assays 25% copper, 15 ounces silver and about \$5 gold. The claims located on this section of the lode are the Rosa, Great Republic, Vanderbilt, Woolcott and Spanish. Work of developing them has just been started. A company, of which Thomas Couch, Wm.

Kissel, E. Buettner and Col. Compson are the principal members, was recently organized, and a working capital of \$100,000 has been secured in the East by the sale of stock. Fifty thousand shares were readily disposed of at \$1 per share, but the stock is no longer to be had at that figure.

The only developments thus far made have been on the Rosa. The intention is to run a tunnel westerly from the east foot of the mountain and at the same time sink on the Vanderbilt, so as to connect with the tunnel. It is expected that the main ledge will be struck at 550 ft., and connection between shaft and tunnel made at a depth of 300 ft. The Great Republic, Vanderbilt and Spanish, which are all situated on the main ledge, show, instead of copper, galena and carbonates.

Judging from the high standing and extensive experience of the men connected with this new enterprise, a bright future is predicted for the Great Republic mining company.

In the Carbonate mine, situated about two miles north of Frisco, considerable work is being done, and the main shaft have already attained a depth of 500 ft. The company, of which Mr. C. D. Bigelow is the president and moving spirit, have recently added to their extensive works above ground a Frue concentrator. Owing to the mixed character of the ore body a great many experiments have been resorted to in the past without encouraging results, but all difficulties in the way of successful working are now thought to be overcome. As yet the company have very primitive hoisting works, consisting of a small donkey-engine and a bucket, and, as I did not relish the pleasure of a ride in such a conveyance down a shaft 500 ft., which, for the first 135 ft., is perpendicular, and then runs on an incline, I cannot state from personal observation anything about the ledge or ore body.

### The Pine Grove District

Is situated 25 miles southwest from Frisco. It was organized in 1872, but abandoned until 1879. The principal mines in this district are the Carrie Lusille, Crystal Palace and Pinafore, which belong to the Pine Grove Con. Silver Mining Co., organized under the laws of Utah. John M. Burke is President, Col. Kahn Vice President, C. W. West Secretary, and Peter Tischer Superintendent. The formation is quartzite, and the ore is hard carbonates, mixed with some galena. On the Carrie Lusille, an incline shaft has been sunk to a depth of 150 ft.; and \$6 ft. from the top of the shaft a level running east developed an ore body three feet in width. Five tons of this ore shipped to Salt Lake city went 16% lead, 77 oz. silver, and \$8.50 gold to the ton, which may be considered a fair average of what has been found. Another level run northwest showed less ore and of lower grade. The width of the ledge, which on top only measured from 6 to 8 inches, has increased to about 2½ ft. in bottom of the shaft; and assays taken from there showed 58 oz. of silver, \$10 gold, and 14% lead. Further sinking was abandoned on the 20th of March, owing to a strike of water, which amounts to 30 gallons per hour; but Mr. Tischer is again preparing to prosecute the work vigorously, both in the shaft and on the levels.

The Pinafore has a tunnel 75 ft. and a shaft 40 ft., showing a large body of ore carrying 65% lead. The Chrystal Palace has an incline shaft 40 ft., but very little ore, though it may yet prove a valuable mine.

All these are true fissure veins and the croppings can be traced for 500 ft. on the surface. Other mines in this district with good ore in sight are, the Col. Compson, Grey Eagle, Hidden Treasure, Miller and Carbonate, but only the two first named are at all developed, the first being down 110 ft. and the other 50 ft. Timber and water are plentiful in this vicinity. —A. L. M.

### Copper Smelting—Its History and Processes.

[By HENRY HUBERT VIVIAN, M. P.]

The President of the Royal Institution for the present year, H. H. Vivian, Esq., M. P., delivered the last of the pre-Christmas course of lectures in the theater of the Institution, at Swansea, South Wales, on Monday evening, December 20, 1880, before a large and attentive audience. Mr. Vivian said:

I shall endeavor in the lecture I am about to give on "Copper Smelting" to avoid on the one hand mere scientific and, on the other, mere technical details. My aim will be to tell you as simply and concisely as I can, the story of copper smelting as I understand it; to import into it some of the experiences of the 37 years during which I have been actively engaged in it; and in doing so, I hope that I may succeed in giving a few grains of useful information, both positive and negative; that is, both what to do and what not to attempt. Smelting is a "dry" process necessarily, and although it has much "fire" in it, I fear I can impart none to my tale tonight. Now it must occur to anyone, I think, in considering this question, to ask in the first instance how and

When Copper Smelting Began.

I am not aware that a perfectly satisfactory reply can be given to that question. The only authentic history we possess of very early times is the Bible; in it we find constant mention of brass, while the word "copper" occurs only once in the Old Testament, namely, in the 8th Ezra, 27th verse, where it is stated that "two vessels of fine copper, precious as gold, were offered

with gold and silver vessels to the house of God;" but even in that case the annotation in the margin is, instead of "fine copper," "yellow or shining brass." It seems, therefore, uncertain whether, even in this solitary instance, "fine copper" was used. There is, indeed, grave reason to doubt whether pure copper was used in very early ages, either in Europe or Asia. On the other hand, brass, or rather bronze, was in common use, although the above extract, dating only 457 years B. C., seems to assign to it a very high value. I say bronze and not brass, because the alloy was copper and tin, which is, properly, "bronze," while "brass" is an alloy of copper and zinc. What we now call brass was produced by heating metallic copper and a mineral called "Lapis Calaminaris" together with charcoal in a crucible, whereby the carbonic acid was driven off, and the zinc contained in the "Lapis Calaminaris" was reduced to metallic zinc, and thus alloyed with the copper. It seems also probable, from the evidences produced by Dr. Percy, in his valuable work on zinc, that the furnace deposits produced in smelting zinciferous copper ores were used to produce brass by heating them with metallic copper precisely as in the case of Lapis Calaminaris. The metal thus produced was called "Orichalcum" by the Romans, in contradistinction to "Æs," which, although often ignorantly translated brass, was really bronze, that is, copper and tin with occasionally some lead—9 to 1. "Orichalcum" seems to have been well known at the commencement of the Christian era; but I can find no evidence of its earlier use, and I think we may assume that when "brass" is spoken of in the Bible, an alloy of copper and tin, not copper and zinc, is meant. There is scarcely a book in the Old Testament in which the word brass does not occur; in fact, it is mentioned 38 times in the Pentateuch, excluding Deuteronomy. Beginning in Genesis, we find, in the 22d verse of the 4th chapter, that "Zillah bare Tubal Cain (the seventh in descent from Adam), he was an instructor of every artificer in brass and iron." The date assigned to this chapter is 3875 years before Christ. In this book of Exodus, there are 10 separate cases in which brass is mentioned. The first is in the 25th chapter and 3d verse, where God directs Moses to instruct the children of Israel to bring "offerings of gold, and silver, and brass for the purpose of constructing the 'Sanctuary,' the supports and vessels of which were to be of brass;" the date assigned to this is 1491 B. C.

It would occupy too much of my time to attempt to go through the numerous instances in which brass is mentioned in the Old Testament; but I will first ask one moment to draw attention to the extent to which brass entered into the construction of the Temple of Solomon, B. C., 1005. We are told that King Solomon sent to Tyre for a man called Hiram, a worker in brass, "who was filled with wisdom and understanding, cunning to work all works in brass;" he cast two pillars, each 18 cubits high, or 32.832 ft. high, nearly 33 ft.—and 12 cubits or 21 ft. in circumference, say 7 ft. in diameter. He then cast a chapter or capitol for each, 5 cubits or 9 ft. high. Then follows a detailed description of the brass work with which he ornamented these pillars, which stood on each side of the porch. He also made a molten sea of brass 18 ft. in diameter, and 12 oxen of brass to support it. He made various other large bronze castings richly ornamented and engraved with lions, oxen and cherubim. Twenty-five verses are devoted to the description of Hiram's works in brass. We may deduce from this passage that the casting of bronze had attained great perfection nearly 3,000 years ago; in fact, it would be a considerable work, even at the present moment, to cast bronze pillars 33 ft. high and 21 ft. in circumference, or a bronze basin 18 ft. in diameter. To make such a casting, a large quantity of metal would have to be melted at once, not probably in crucibles, but in a cupola or reverberatory furnace, and great skill would be required in manipulating so heavy a casting. It is also clear that the art of molding was well understood. From whence did the copper and tin come, and who smelted it?

If we turn from the inspired history of the Bible to those

### Records of Past Ages

Which are stored up in the harrows, lakes, refuse heaps and battle fields of Europe, we find equally clear and indisputable evidence of the great antiquity of copper, not indeed, as copper in its pure state, but as bronze. There seems no reason to doubt that bronze was the first metal used by man for the construction of implements and weapons. As a metallurgist, I should have certainly said, *a priori*, that iron, from the abundance of its ores, occurring, as I think I am safe in asserting that they do, in every known geological formation, and from the ease with which rich ores of iron can be reduced to metallic iron, ought to have been the first to attract the attention of man; but I am bound to say, that the evidence adduced by my friend, Sir John Lubbock, in his admirable work on "Prehistoric Times," and by others, appears to me to leave no doubt that an age of bronze succeeded the stone age, and preceded the iron age. I think I am right in saying that no attempt has been made to fix anything like an approximate date to the commencement of the bronze age; but Sir John Lubbock appears to be of opinion that the transition from bronze to iron took place about 900 years B. C. This would be nearly 2,800 years ago, and through what a long vista must we look back before we see the commencement of

(CONTINUED ON PAGE 246.)



MECHANICAL PROGRESS.

Progress in Metallurgy.

Jacob Reese, the well-known scientist, metallurgist and inventor, of Pittsburgh, Pa., furnishes the following interesting items on the above subject to the *American Machinist*. Two hundred years ago wrought iron was only made by the Catalan process, the product being known as charcoal blooms. By the ordinary Catalan process it required two hours to convert 300 lbs. of cast iron into wrought iron, and required 300 bushels of charcoal to the ton of blooms.

"The puddling process, invented by Henry Cort, and improved by Samuel Rodgers, will convert 500 lbs. of cast iron into wrought iron in two hours, with an expenditure of ten bushels of coal to each ton of fibrous wrought iron.

"By my improved Bessemer process, I am now enabled to convert ten tons of cast iron into fibrous wrought iron in 20 minutes, at an expenditure of ten bushels of coal to each ton of fibrous wrought iron ingots produced.

"Five years ago, Sir Henry Bessemer and all the leading metallurgical experts of the world considered it impossible to remove phosphorus from the metal by the Bessemer process; consequently, no metal could be used in the converter which contained over one-tenth of 1% of phosphorus. Now, by the basic improvements to the Bessemer process, metal containing from 2 to 3% of phosphorus may be treated in a converter to advantage, and a steel produced more free from phosphorus, and better in every respect than that produced by Bessemer's acid process.

"The old method of making railroad spikes was by rolling a pile down to a rod of suitable size, to do which required a man to rough down and another to rough up, and another to straighten the rods, and a man to spear the rods into suitable lengths, and a man to weigh, and a laborer to carry them to the spike factory, where one end of the rods was beated and fed—one spike length into the spike machine at a time, one machine making from three to five tons per day. "Now, we have in Pittsburgh a continuous spike mill, at one end of which the heater inserts the pile or billet. By the automatic action of the machine it is drawn forward and reduced on all sides, until it emerges from the other end in shape suitable for a spike. The rod is then cut in two pieces of equal lengths, and the ends so cut inserted into two self-feeding machines and shaped into spikes, which are caught by an archimedean conduit, and delivered red hot, at the point desired for packing, and this at the rate of 80 tons per day."

To the above we may add the following: Cast iron was not in commercial use before the year 1700, when Abraham Darby, an intelligent mechanic, who had brought some Dutch workmen to establish a brass foundry at Bristol, England, conceived the idea that iron might be substituted for brass. This his workmen did not succeed in effecting, being probably too much prejudiced in favor of the metal with which they were best acquainted. A Welsh shepherd boy named John Thomas had, some little time previous to this, been received by Abraham Darby into his workshop on the recommendation of a distant relative. While looking on during the experiments of the Dutch workmen, he said to Mr. Darby that he thought he saw where they had missed it. He begged to be allowed to try; so he and Mr. Darby remained alone in the workshop all night, struggling with the refractory metal and imperfect molds. The hours passed in and daylight appeared, but neither would save his task; and just as morning dawned they succeeded in casting an iron pot complete. The boy entered into an agreement with Abraham Darby to serve him and keep the secret. He was enticed by the offer of double wages to leave his master, but he continued faithful, and from 1709 to 1822 the family of Thomas were confidential and much-valued agents to the descendants of Abraham Darby. For more than 100 years after the night in which Thomas and his master succeeded in making an iron casting in a mold of fine sand contained in frames and with air holes, the same process was practiced and kept secret at Colebrook Dale, with plugged eyeholes and barred doors.

A MECHANICAL COTTON PICKER.—A Southern planter writes to Boston respecting a combination cotton picker with fingers of iron, which is the beginning of a revolution in cotton growing. He believes it will lessen the price of cotton five cents a pound. The machine, by means of eaters and fans, takes the fiber from the ball, removes the seeds and all impurities, finally delivering it straightened, ready for the bale. Efforts are making to develop the invention in season for the exhibition at Atlanta.

TO SOFTEN BRASS CAST FROM SCRAP.—The trouble with brass cast from scrap, is usually to be ascribed to the presence of iron or steel scrap that gets mixed with it in the shop. In that case only a chrome steel tool will answer to work it. The *Manufacturer and Builder* suggests that the best plan is to melt the scrap at a low heat as possible, with the addition of some powdered glass as flux, by which procedure the iron will be fluxed out, and the brass left comparatively free.

How to Increase the Power of the Steam Engine.

It frequently happens that engines which were originally of sufficient power to do the work of a manufacturing establishment, become unable to do the work, owing to an increase in the business; and while the cost of replacing an engine with one of sufficient power would be a matter of nominal consideration, the time expended in removing and replacing it with a larger one might involve a serious loss to the owner, in case he had large orders for goods to fill at profitable prices. Under such circumstances the three most practicable ways to remedy the difficulty for the time being would be—first, to raise the pressure, providing the boiler is considered safe; second, to increase the speed of the engine; third, to replace the old cylinder with a new one larger in diameter.

For a moderate increase in power the last plan would be the most safe and practicable, as the active condition of steam boilers is not always understood; and, without a thorough knowledge on the subject, it would be unwise to increase the pressure, nor should any engine be run at a higher speed than it is capable of standing without springing or shaking to pieces.

Of course the margin for increasing the size of cylinder for any engine, and using all the other original parts of the engine, is limited, and should never exceed two inches; as, to exceed that limit, the other parts would be too light, and become liable to spring. An engine will develop more power by increasing its speed, but will use more steam, and as a consequence more fuel will be consumed. The overtaxing of steam engines and boilers, or any other class of machines, is sure to induce waste either in fuel or wear and tear. Steam engines or boilers, or any other class of machines that are too large or too small for the work to be performed, are not economical.

On the Elasticity of Wire.

Mr. J. J. Bottomley has published the results of a series of experiments made on the elasticity of wire. Using a continuous arrangement for applying the stretching weight and employing some very soft iron wire which had been specially prepared, and which was used in former experiments, the greatest weight which could be rapidly put on the wire without breaking it was determined. It was found that with a weight of 41 lbs. gradually applied in 6 1/2 minutes, the wire stretched by 24.4% of its original length, and broke 18 minutes after the weight was put on. With the same weight, 41 lbs., applied in 6 1/2 minutes the wire stretched 22.1% and broke in 24 minutes. With 41 lbs. however, applied in 7 1/2 minutes, the wire stretched 18% and did not break. This weight, therefore, appeared to be just as much as the wire would bear with this method of applying the weight. Accordingly it was applied to a great number of wires for different lengths of time, for the purpose of hardening them, and arrangements have been made for keeping a number of wires for very long times with this stretching force applied to them. The amount of extension produced by the application of the hardening stress was observed in each case.

After the hardening stress had been applied for a certain time the additional weight necessary to break the wire was determined, and also the additional elongation before breaking, which was in all cases almost insensible. The wires seemed permanently set in about 40 minutes from the time when the hardening stress was applied. They did not alter in length till just before they broke, when they generally stretched .04 to .08 inch on a length of about 70.8 inches.

WORK FOR WORKING.—How much of work is done, time and trouble expended in foolishness few know. Even the foremen of shops don't know half the nonsense in work that is done for the lack of common sense. Much of the time wasted in shops in apparent occupation is that used up in unnecessary finishing. There is a large amount of work done, in the machine shop, for instance, that is wasted work. No allusion need be made to the shortcomings of apprentices who simply make mistakes for need of instruction, oversight and guidance; but old workmen seem to think they show their skill and exhibit their workmanship by finical and needless finish on plain work. The sole object of work is to produce the result. And the result is just as certainly produced when the completed machine does its duty as if the machine was also a work of art. The finish and polish are necessary adjuncts when finish means perfection and polish means attraction; one is for use and the other for financial returns. But when unnecessary labor is expended on a machine its value is not enhanced to the purchaser, and the cost of the unnecessary labor is borne by the builder. All the working actuating parts of any machine should be finely finished. That is, no working part should be slighted. But it is not necessary that any portion of a machine not exposed to view or in daily use should be finished—polished. A casting or a forging, cleaned from its sand, sprues, and oxide, will do just as good work and fill its place as a part of the machine as well as though it should be polished so the sun is reflected in it. The grand idea of a finished machine is adaptability, proportion, usefulness and durability. These conditions secured, all other work is wasted.—*Boston Journal of Commerce*.

SCIENTIFIC PROGRESS.

Experimental Transformation of a Living Organism.

The bulletins of the Academy of Science at Munich contain a report of a discovery which has the highest interest for the theory of evolution, and will perhaps be of practical value. Hans Buchner, well known as a skillful experimenter, has succeeded in transforming a microscopical kind of fungi, which is a dangerous agent of disease, into another kind of fungi, which is perfectly harmless. He reached this result by a continuous treatment of the fungi for the space of six months, and by producing 1,500 generations. In this manner he was able to transform those bacteria that cause "milk-rot" (the dreaded inflammation of the spleen), into the so-called "heupilze" (fungi of bay), which are harmless, and vice versa. And even more, he produced an organism that forms a connecting link between the above named fungi, and which was hitherto unknown. To give a detailed description of the experiment would take too long. We only mention two facts which will show with what organisms the experiment was made. The bay fungi, such as can be produced in an infusion of bay, have such an enormous vitality that their life cannot be destroyed even by boiling the liquid which contains them for hours, and each of these little beings is able to propagate itself and to produce ten generations per day.—*Scientific American*.

IMPORTANCE OF TEACHING SCIENCE.—From a recent debate in the House of Lords, it seems the importance of teaching science is beginning to be recognized among the English nobility. According to *Nature* the Earl of Spencer made use of the following remarks: "There was no more important matter than the application of science to the art of agriculture. Great attention had of late years been properly called to the great aid which science gave to the various classes of manufacturers and producers; and that principle applied with quite as great force to agriculture as any other art. That was especially the case at the present moment, when the country was inquiring narrowly into the whole of our agricultural system. If science could enable an agriculturist to produce more from land than he had hitherto done, it would add another to the many useful things it had been the means of accomplishing. It had been decided by the Science and Art department, in consequence of the pressure for accommodation for science classes, not to have a special class for agricultural science this year, seeing that botany, geology and chemistry, which are so intimately connected with agriculture, are taught separately."

ASTRONOMICAL OBSERVATORIES.—According to the *Annuaire* of Brussels Observatory for 1881 there are at present 118 public astronomical observatories in full activity, viz.: 84 in Europe, 2 in Asia, 2 in Africa, 3 in Oceania and 27 in the two Americas. The United States alone have 19, Mexico has 2, Brazil, Chile, Columbia, Ecuador, the Argentine Republic and New Britain 1 each. In Europe Prussia is the State which has the most public observatories; it has 29; next come England and Russia, which have respectively 14 and 12; then Italy, which has 9, Austria, 6, France, 6, Switzerland, 4, Sweden, 3, Holland, Norway and Portugal 2 each; lastly, Belgium, Greece and Denmark. The oldest observatory in operation at present is that of Leyden, founded in 1632. In America since 1870 six observatories of the best construction and most perfect equipment have been established.

AN ILLUSTRATION OF AMOEBOID MOVEMENTS. The curious movements of the lowest forms of life are illustrated by Dr. Haeckel with a simple mechanical contrivance, which will be found useful in the classroom. He takes an India-rubber ball, perforated with a number of small holes, fills it with colored albumen (white of egg), and immerses it in a solution of sugar of about the same density as the albumen. A gentle pressure applied to the ball forces out the albumen in finger-like processes, which are retracted when the pressure is relaxed, thus clearly imitating the extension and retraction of the amoeboid processes of protoplasm familiar to all microscopists.

MINE EXPLOSIONS.—It is well known that if a long, dry tube, open at both ends, be held over a jet of burning hydrogen a musical sound is produced, the pitch and quality of which vary with the length, thickness and diameter of the tube. It has been proposed, says the *Electrician*, to adapt such a tube to the safety lamp underground, and to place it near a telephone in communication with another telephone in the manager's office on the surface. The alteration of the sound, due to a greater or less admixture of gas with the air of the mine, would warn the manager of the state of the atmosphere in the workings.

SPECTRUM PHOTOGRAPHY.—Capt. Abney recently read an interesting paper before the Royal Society touching some important results he has recently obtained in spectrum photography. His experiments relate particularly to organic chemistry, and are likely to upset some of the recognized theories of our chemists; here is one instance the more of the value of photography in scientific research.

Railways and Rainfall.

Scientists are again discussing the connection alleged to exist between the operations of railways and the amount of rainfall. It is regarded as a remarkable fact that before railways were extended to the Pacific, the country lying between the Sierra Nevada and Rocky mountains was subject to an almost continuous drouth. Since then, however, the region has been visited with frequent falls of rain. What has produced the change? is the question. Some suggest that it is due to a change in the electrical state of the atmosphere, produced by the conduction of the subtle fluid into the region by the iron rails. Others assert that it is caused by the atmospheric disturbances arising from the frequent passing and repassing of trains. It is shown that up to 1854 the United States had been periodically visited by great and general drouths, but since that year there has been no such visitation; or, in other words, that the building of such a vast network of railways as has been constructed in the last quarter of a century has had the effect of promoting the fall of rain. Since the general introduction of railways in Europe, also, there has been no drouth such as previously at short intervals caused widespread distress. In the case of England it is remarked that although the climate has been always humid there has been a growing excess of rainfall during the period of railway building, until now she gets far more than is beneficial to the crops. This has been noticeable to an alarming degree in the past few years. We give these conclusions for what they may be worth, and merely as showing the drift of current discussion on this point.

UTILIZING SOLAR HEAT.—It is not impossible that, before our coal fields are exhausted, we shall have discovered some means of doing many things without that fuel—at least, in regions where the sun shines. We are already acquainted with M. Mouchot's solar engine, but that method of utilizing the heat of the sun has been eclipsed by an improvement devised by M. Fieffe. It is stated that the latter has gone so far as to utilize 80% of the available heat of the sun's rays at Paris, and has actually constructed an apparatus with which he pumped water to a height of 10 ft. at a rate of over 20 gallons a minute. As in Mouchot's solar engine, a reflector receives the light and concentrates it upon a boiler—in this case containing nearly 90 gallons of water, which, under a clear Paris sky, begins to boil in about 40 minutes, and in a few minutes longer has sufficient pressure to drive the engine working the pump.

POLARIZATION OF SOUND.—Prof. S. W. Robinson, of the Ohio State University, has lately succeeded in polarizing sound waves. This was anticipated some six years ago, and apparatus made for experimental verification. Last spring the verifying experiments were made by Mr. C. H. Wright, under the direction of Prof. Robinson, establishing the fact of polarization beyond dispute. The vibrations in sound waves are known to be longitudinal, and the fact of their polarization will materially modify the theory of vibration in light, they heretofore being accepted by authority generally as transversal. But if longitudinal vibrations in sound are polarizable, luminous vibrations are therefore probably longitudinal only.

COMBUSTIBILITY OF IRON.—The late Prof. Magnus, of Berlin, devised the following beautiful experiment for showing the combustibility of iron: The pole of a good sized magnet is approached to a mass of iron filings, a bunch of which readily attaches itself thereto. In this condition, being not only in a highly comminuted state, but carrying a large quantity of air mechanically entangled in the loosely aggregated mass, the iron is in so favorable a condition for combustion that the approach of an ordinary spirit lamp is sufficient to inflame it, when it burns readily, like any ordinary combustible. By waving the magnet to and fro a brilliant effect is produced from the showers of sparks thrown off from the burning metal.

FORMATION OF SULPHUR.—The subsoil of Paris contains abundance of sulphur, now in course of formation, as was recently proved in making excavations in the Place de la Republique. M. Daubree says that this native sulphur has nothing to do with the escape of gas from the mains, but that its origin is due to the simultaneous presence of various kinds of organic substances and of gypsum in the soil.

THE FUTURE OF THE TELEPHONE.—During a series of experiments made under the auspices of the French postal authorities, Dr. Cornelius Herz succeeded in transmitting audible speech a total distance of 800 miles with the aid of his telephone system.

FEVER GERMS.—Prof. Klebs, of Spragne, is reported to have discovered peculiar microbia in the remains of patients who have died of typhoid fever. They do not occur in the bodies of persons who have been carried off by other diseases.

TUCSON, Arizona, has two banks, with a capital of \$50,000 each, and agencies at Tombstone. Money commands 1 to 2% per month. Exchange on San Francisco costs 1/2% premium. Freight to San Francisco is, by express, \$9 per 100 lbs., and by railroad, respectively for first, second and third-class, \$3.50, \$3.25 and \$3; fourth-class, \$2.75, and fifth-class, \$2.50. There are about 50 wholesale stores.



Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 24	Week Ending Mar. 31	Week Ending Apr. 7	Week Ending Apr. 14
Alphas.....	2.30	2.90	2.31	3.40
Alta.....	1.30	1.60	1.25	1.80
Andes.....	1.20	1.10	1.15	1.25
Albion.....	1.15	1.15	1.20	1.20
Argenta.....	2.00	1.50	1.00	4.00
Ardena.....	2.00	2.00	2.00	2.00
Belcher.....	1.15	1.85	1.20	1.85
Belmont.....	3.00	2.50	3.00	3.00
Best & Belcher.....	7.50	6.00	7.00	8.00
Bullion.....	3.50	2.50	3.00	1.35
Buchanan.....	5.00	4.50	5.50	4.50
Belle Isle.....	5.00	5.00	4.50	4.50
Bodie.....	6.00	5.00	6.00	6.00
Benton.....	6.00	5.00	6.00	6.00
Bulwer.....	1.30	1.30	1.00	2.00
Boston.....	7.50	6.00	1.00	2.00
Black Hawk.....	2.00	2.50	1.50	2.50
Belvidere.....	3.50	5.00	1.50	2.50
Booker.....	1.00	1.00	1.00	1.00
Caledonia.....	1.00	1.00	1.00	1.00
California.....	9.50	9.00	1.30	1.40
Challenge.....	6.50	6.00	6.50	7.00
Chollar.....	1.50	1.65	1.20	2.95
Confidence.....	2.50	2.50	2.50	2.50
Con Imperial.....	1.50	1.50	1.50	1.50
Con Virginia.....	1.50	1.50	1.50	1.50
Crown Point.....	1.35	1.05	1.10	1.45
Columbus.....	1.50	1.50	1.50	1.50
Conception.....	1.50	1.50	1.50	1.50
Concordia.....	2.10	2.10	1.90	1.10
Concordia (Va.).....	5.00	4.00	5.00	5.00
Con Pacific.....	1.75	9.00	5.00	9.00
Deer.....	1.50	1.50	1.50	1.50
E. Mt. Diablo.....	2.00	1.50	1.50	1.50
Eureka Con.....	2.50	2.50	2.50	2.50
Exchequer.....	8.50	7.50	1.15	1.05
Grand Prize.....	7.50	6.00	5.00	5.00
Golden Gate.....	1.15	1.15	1.20	1.15
Goodshaw.....	8.00	6.00	7.50	6.00
Gould & Curry.....	3.50	3.50	3.50	3.50
Hale & Norcross.....	3.15	3.15	3.15	3.15
Head Center.....	3.70	3.15	3.15	3.15
Hussey.....	1.50	1.50	1.50	1.50
Independence.....	1.50	1.50	1.50	1.50
Julia.....	5.50	4.00	5.50	4.00
Justice.....	1.50	1.50	1.50	1.50
Jackson.....	3.50	1.50	1.50	1.50
Jupiter.....	3.50	1.50	1.50	1.50
Kentucky.....	1.30	1.10	1.10	1.30
Kosuth.....	1.50	1.50	1.50	1.50
Lady Bryan.....	1.50	1.50	1.50	1.50
Lady Wash.....	1.00	1.50	1.00	1.50
Leviathan.....	1.50	1.50	1.50	1.50
Leds.....	1.50	1.50	1.50	1.50
May Belle.....	1.50	1.50	1.50	1.50
Modoc.....	1.50	1.50	1.50	1.50
Manhattan.....	1.50	1.50	1.50	1.50
Martin White.....	1.50	1.50	1.50	1.50
McClintock.....	1.50	1.50	1.50	1.50
Mono.....	9.50	7.50	1.50	1.50
Mexican.....	4.70	4.15	4.60	4.95
Mt. Diablo.....	6.00	5.00	5.00	5.00
Morning Star.....	1.30	1.70	1.00	2.00
Northern Belle.....	1.30	1.70	1.00	2.00
North Nevada.....	1.30	1.70	1.00	2.00
Navajo.....	1.30	1.70	1.00	2.00
Northern Nevada.....	1.30	1.70	1.00	2.00
Original Keystone.....	3.40	3.10	3.35	3.85
Overman.....	1.50	1.50	1.50	1.50
Oro.....	1.50	1.50	1.50	1.50
Paria.....	1.50	1.50	1.50	1.50
Potosi.....	2.15	2.45	2.15	2.95
Queen Bee.....	1.50	1.50	1.50	1.50
South Bulwer.....	1.50	1.50	1.50	1.50
Savage.....	1.50	1.50	1.50	1.50
Seg Belcher.....	1.50	1.50	1.50	1.50
Sierra Nevada.....	1.50	1.50	1.50	1.50
Silver Hill.....	3.00	2.50	3.00	3.00
Silver King.....	2.50	2.50	2.50	2.50
Succor.....	1.50	1.50	1.50	1.50
Summit.....	1.50	1.50	1.50	1.50
Scorpion.....	1.15	1.05	1.10	1.30
Solid Silver.....	1.50	1.50	1.50	1.50
South Bodie.....	1.50	1.50	1.50	1.50
South Standard.....	1.50	1.50	1.50	1.50
Syndicate.....	3.50	3.00	3.50	3.00
Toga Con.....	5.00	3.50	4.00	4.00
Tiptop.....	4.65	3.00	4.40	4.40
Tuscarora.....	1.50	1.50	1.50	1.50
Union Con.....	1.50	1.50	1.50	1.50
Ward.....	1.50	1.50	1.50	1.50
Wales.....	1.50	1.50	1.50	1.50
Yellow Jacket.....	2.35	3.00	2.70	3.15

Sales at S. F. Stock Exchange.

Thursday A.M. Apr. 14	1170	Scorpion.....	2.30	2.20
515 Alta.....	3.10	100 Solid Silver.....	3.00	3.00
100 Alpha.....	4.40	80 Utah.....	1.10	1.10
350 Andes.....	2.45	350 Union.....	1.00	1.00
600 Atlantic.....	2.50	250 Yellow Jacket.....	4.00	2.50
240 B & Belcher.....	9.00			
1265 Belcher.....	2.15			
1320 Bullion.....	1.55			
150 Benton.....	1.30			
520 California.....	1.30			
235 Chollar.....	2.85			
380 Con Virginia.....	2.05			
80 Crown Point.....	1.50			
400 Con Imperial.....	1.50			
50 Confidence.....	1.50			
60 Caledonia.....	1.50			
500 Challenge.....	1.20			
180 Exchequer.....	1.30			
270 Gould & Curry.....	1.50			
380 Golden Gate.....	1.15			
480 Hale & Norcross.....	1.50			
2050 Julia.....	1.50			
450 Justice.....	1.50			
405 Mexican.....	1.50			
100 New York.....	1.50			
215 Ophir.....	1.50			
250 Overman.....	1.50			
250 Oreg. Gold Hill.....	1.50			
250 Occidental.....	1.50			
450 Potosi.....	1.50			
720 Savage.....	1.50			
500 Silver Hill.....	1.50			
620 Sierra Nevada.....	1.50			

ELECTRIC LIGHTS IN HYDRAULIC MINES.—In speaking of the use of electric lights in hydraulic mines, the Nevada Transcript says: Two have been in use at the North Bloomfield hydraulic mine for many months past, and piping is carried on there at night the same as by day. If necessary, all kinds of work about the claim could be done at night with the same facility as by daylight by increasing the number of lights. The expense is merely nominal. Superintendent Perkins says that electric lights for mines are a success in every respect.

A PROMINENT mine owner informs the Nevada Transcript that it is next to impossible to find a first-class miner in the camp who is not at work. He spent three days trying to hire two good men, and up to latest advices had not succeeded in getting one.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Nevada	20	50 Mar 5	W H Watson	302 Montgomery st
Andes S M Co	Nevada	16	25 Mar 1	B Burd	309 Montgomery st
Best & Belcher M Co	Nevada	20	50 Mar 17	W Willie	309 Montgomery st
Belcher S M Co	Nevada	27	75 Apr 12	Jno Crockett	327 Pine st
Belmont M Co	Nevada	28	10 Mar 8	J W Pew	310 Pine st
Bullion M Co	Nevada	13	1 00 Feb 28	J M Hub	328 Montgomery st
East Noonday M Co	California	1	10 Mar 18	C V Hubbard	310 Pine st
Caledonia S M Co	California	34	25 Mar 5	R Wegener	414 California st
Confidence S M Co	Nevada	12	50 Feb 12	R Wegener	414 California st
Crown Point & S M Co	Nevada	45	50 Mar 23	Jas Newlands	327 Pine st
Deer S M Co	Nevada	68	50 Mar 3	J F Lightner	309 Montgomery st
Justice M Co	Nevada	34	25 Mar 25	R E Kelley	419 California st
Leviathan M Co	Nevada	12	25 Mar 23	F A Friest	330 Pine st
Mono G M Co	California	11	50 Mar 17	W H Lent	309 Montgomery st
Mexican M Co	California	15	50 Mar 16	L Mc Coy	309 Montgomery st
Northern Light M Co	California	1	15 Mar 2	F S Monroe	310 Pine st
Overman M Co	Nevada	49	50 Mar 17	G D Edwards	414 California st
Occidental Con G M Co	California	6	04 Feb 21	W T Smith	402 Montgomery st
Ophir M Co	Nevada	39	1 00 Mar 4	C L Mc Coy	300 Montgomery st
Sierra Nevada M Co	Nevada	1	10 Mar 4	D W Smith	323 Montgomery st
Savage M Co	Nevada	46	50 Apr 4	E B Holmes	309 Montgomery st
University G M Co	California	8	10 Apr 6	Wm Letts Oliver	323 Montgomery st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Amelia G M Co	California	1	10 Mar 14	Apr 22	May 17	J B Leighton	527 Clay st
Black Hawk G M Co	California	11	10 Mar 1	Apr 5	Apr 28	H A Charles	409 California st
Brooklyn Con M Co	California	1	05 Feb 21	Apr 20	May 12	J T McGehegan	318 Pine st
Delano G S M Co	California	1	05 Mar 23	Apr 26	May 16	F Morio	328 Montgomery st
Golden Fleece G M Co	California	20	30 Mar 2	Apr 3	Apr 29	F R Schirmer	785 Folsom st
Golden Gate Con H M Co	California	4	50 Mar 25	May 1	May 25	J T McGehegan	318 Pine st
Grand Prize M Co	California	15	25 Mar 9	Apr 6	Apr 26	F S Monroe	310 Pine st
Excelsior G M Co	California	15	25 Mar 9	Apr 6	Apr 26	D E Chisholm	327 Pine st
Elmtracht G M Co	California	6	05 Mar 12	Apr 18	May 9	H Kunz	209 Sansome st
Hasloe M & M Co	California	7	40 Feb 18	Mar 28	Apr 20	W Van Bokelen	California st
Idaho M Co	Nevada	7	25 Mar 17	Apr 5	May 18	R Wegener	414 California st
Independence M Co	Nevada	7	25 Mar 17	Apr 5	May 18	B M Hall	327 Pine st
Ivanpah M Co	California	3	10 Mar 5	Apr 9	Apr 26	E J Friedlander	309 California st
Jupiter M Co	California	12	25 Mar 19	Apr 22	May 19	E C Maest	309 Montgomery st
Liquis G S M Co	Nevada	1	25 Mar 19	Apr 22	May 13	A C Cooper	323 Montgomery st
Mayhew Con M Co	California	7	25 Mar 19	Apr 22	May 13	W J Taylor	310 Pine st
Montezuma Tunnel M Co	California	4	25 Mar 19	Apr 22	May 30	F B Luty	309 Montgomery st
Mono M Co	California	11	50 Mar 17	Apr 22	May 12	W H Lent	309 Montgomery st
McElroy Gravel M Co	California	5	10 Mar 8	Apr 13	May 3	L Lillie	607 Washington st
McMillan S M Co	Arizona	3	25 Jan 12	Apr 28	May 26	J Morio	323 Montgomery st
Martin White M Co	Nevada	9	25 Mar 19	Apr 22	May 24	J F Scoville	309 Montgomery st
Mt Potosi Con M Co	Nevada	6	25 Apr 6	May 13	June 6	E A Holmes	318 Pine st
Original Keystone M Co	Nevada	4	25 Mar 19	Apr 22	May 12	F E Luty	330 Pine st
Oakland G M Co	California	14	05 Feb 24	Mar 23	Apr 5	D H Hopkins	435 Montgomery st
Paria Valley M Co	Nevada	14	25 Jan 31	Mar 23	Apr 15	Wm Letts Oliver	323 Montgomery st
Real Del Monte M Co	Nevada	14	25 Jan 31	Mar 23	Apr 15	C V Hubbard	310 Pine st
Rocky Point M Co	California	7	5 Mar 19	Apr 25	May 16	C W Hughes	330 Pine st
Real Del Monte M Co	California	15	50 Mar 28	May 2	May 30	W G Hubbard	310 Pine st
Santa Cruz W Co	Cal	13	10 Mar 19	Apr 25	May 6	F W Hughes	330 Pine st
South Bodie M Co	California	16	25 Feb 16	Mar 16	Apr 16	W J Taylor	310 Pine st
Tuscarora M & M Co	Nevada	8	15 Apr 2	May 1	May 30	M B Shering	309 California st
Trojan M Co	Nevada	13	10 Mar 7	Apr 11	May 2	David Wilder	328 Montgomery st
Tilden M Co	Nevada	1	10 Mar 12	Apr 16	May 13	E C Maest	309 Montgomery st
Union Con M Co	Nevada	1	10 Mar 7	Apr 11	May 2	J M Bradford	309 California st
Wide Awake M Co	Arizona	12	10 Feb 17	Mar 25	Apr 16	C Hildebrandt	232 Sutter st

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Confidence M Co	California	E T Allen	416 Market	Annual	Apr 18
Indian Queen M Co	Nevada	Grove Adams	Merchants' Ex	Annual	Apr 26
Justice M Co	Nevada	R E Kelley	49 California st	Annual	May 2
Liquis G S M Co	Nevada	A R Cooper	338 Montgomery st	Annual	Apr 16
Morning Star M Co	Nevada	J B Mahom	331 Montgomery st	Annual	Apr 23
North Nevada & Curry M Co	Nevada	W H Ennis	331 Montgomery st	Annual	Apr 23
Republic M Co	California	Wm J Taylor	310 Pine st	Annual	Apr 19
Silver King South M Co	Arizona	A Judson	320 Sansome st	Annual	May 2
Wade M Co	Nevada	Wm H Allen	306 Pine st	Annual	Apr 18

LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	Mar 21
Father De Smet M Co	Dakota	H Dean	New York	50	Mar 1
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	50	Mar 15
Liquis G S M Co	Arizona	Nash	310 Montgomery st	75	Mar 15
Standard Con M Co (2)	California	Wm Willis	309 Montgomery st	75	Mar 12
Western M Co	California	C S Curtiss	309 Montgomery st	75	Mar 2
Navajo M Co	Nevada	E M Hall	327 Pine st	25	Mar 25

The Mining Share Market.

At last there is a sort of "boom" in stocks. One day this week 72,690 shares of stock were sold, the biggest day's work since December 9, 1880. Stocks seem to go up when once started without any special reason, and, as far as we can see, there is no cause for the present rise. A significant circumstance, however, in this connection is the rise in the Suto tunnel stock. It rose Wednesday from 1 1/2 to 2 3/4—a remarkable advance, seeing the large number of shares in the tunnel. New York rumor had it Wednesday that Messrs. Mackay and Fair, individually, are now the principal owners of the tunnel and have the control. If this be so, and it is not at all improbable, the purchase by those who know so well the prospects and condition of the Comstock mine has a world of meaning. At the Yellow Jacket everything is in readiness for operations as soon as the drain hoses are in place in the Suto tunnel. The drain hoses leading from mines have been and are still undergoing repairs. The Belcher company has closed down its old works and are but operating the pump shaft. At the Justice the 1150 level is being cleaned out preparatory to resuming active operations there. The work of sinking the Forman shaft goes steadily on with good progress. The Caledonia continues its pumping and easily keeps the mine clear of water. At the Sierra Nevada connection will shortly be made between the bottom of the incline on the 2300 level with the 2500 level, which will much improve the ventilation. The management claims that there is no truth in the report in circulation that an important development has been made, but admits that they are in favorable ground. Connection between California and Con. Virginia with the C. & C. shaft will be made before long on the 2,500 level and also with Best & Belcher on the 2,300 level which will permit of work being done in each of these mines that cannot now be attempted for lack of air. The pump at the C. N. S. shaft is not yet ready to start and those having it in charge do not state definitely when it will be. THE Blue Monday mine at Tomstone, adjoining the Boh Ingersoll, has been bought for \$15,000 by Eastern parties, who have also bought the Argenta for \$9,000.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Northern Belle, April 6th, \$8,304; Navajo, 12th, \$4,500; Bodie Consolidated, 11th, \$6,171; Northern Belle, 9th, \$11,153; New York and Utah, 5th, \$4,700; Ontario, 5th, \$5,590; Germania, 6th, \$2,700; Ontario, 6th, \$5,633; Horn Silver, 6th, \$5,000; Horn Silver, 7th, \$10,000; Ontario, 7th, \$5,835; Horn Silver, 8th, \$2,500; Ontario, 8th, \$6,184; Mammoth, 8th, \$1,900.

New Incorporations.

This following companies have been incorporated and papers filed in the office of the Superior Court, Department No. 10, San Francisco: Old Guard M. & M. Co.—April 12th. Location: Arizona. Capital, \$100,000.



**IEVADA.**  
A BONANZA AT THE BANER MIN. —*Transcript*, April 9: A bonanza was developed at the Baner mine Friday morning. The mass of the ore when pounded up yields out six dollars worth of gold to the pound. There is a peak an inch thick or more, running through it, that will pay at the rate of \$200 per ton. It will take several days to ascertain the extent of this extraordinary deposit, but judging from the locality where it was found there are very good reasons for believing that the Baner going to be one of the big mines of the district before long.

**MURCHIE MIN.** —The 600-ft drift from the new shaft shows a magnificent body of ore. A single blast made light before the ore was brought down a mass of light gold-bearing rock, sufficiently large to keep the eight stamps of the mill running a couple of days. The pump and cauldrons are being put into the new shaft, and within a few days all the ore will be hoisted through it instead of through the old incline as now. Work is being pushed ahead on the new 20-stamp battery, and the stamps will begin dropping inside of six or eight weeks. When all the new machinery is running the Murchie will be a busy place.

**LACER.**  
DITCH FLAT AND GOLD RUN. —*Placer Herald*, April 9: The Polar Star, an old and reliable hydraulic claim, at Lacer Flat, the property of A. Hayward, John Spaulding, and others, has been recently wintered and has produced good results. They have cleared up twice, realizing about 5,000 each time. They are now making the third run for the season. The ditch, also belonging to Mr. Hayward, has immense storage capacity at its head, which will enable them to run this claim nearly or quite all summer. They work from 65 to 70 men, and what is to their credit, they are all white men. Mr. Lakap has been in the mine since the first season, and has done well. Preparations are making for starting up the Elmore Hill mine, an extension property owned by the San Francisco mines. They hope to get ready in time to make at least a run this season. At Gold Run mining is being prosecuted with unusual vigor. At least 5 hydraulic claims are running in this district, and as near as we can learn they are generally doing well. Some of them are making money the season by running night and day. In addition to these there are two cement mills running in the district, one belonging to the new Gold Run hydraulic mine and the other to the Indiana Hill Co. These mills are used for crushing the lower strata of gravel which, while generally very rich, is too hard or too thoroughly impregnated to wash to advantage. The mining season at the Gold Run and Lacer Flat promises to prove a good one, and the future prospects of both districts were hardly better. The first season of the ground in these districts only took off the surface. By the aid of extensive tunnels for drainage, they are now commencing to wash the lower strata, of which there is more of the upper, and which, though somewhat harder wash, is much better in quality.

**LUMAS.**  
ANTHROP. —*Greenville Bulletin*, April 6: In this mine a 200-ft tunnel is being opened on what is known as a central claim, where they will work the Tanner ledge. GREEN MOUNTAIN. —Both mills are running regularly, 92 mps being constantly at work.

**SOUTHERN EUREKA CO.** —The mill continues running without interruption, and the quality of the rock is fully good as ever. Work in the middle and lower tunnels steadily progressing.

**PRIMUM.** —This is an old claim, situated evidently on a same vein as the old Plumas mine, some two or three miles beyond the Arlington bridge, a little off the road to Marysville, and about nine miles from Greenville. It is owned by W. Young, A. D. McMillan, and several others, and is likely soon to be worked. We learn that the company are negotiating for the purchase of a 10-stamp mill, which they propose to erect on the premises, and a mill with water obtained from the mountain above.

**INDIAN VALLEY.** —The track in the 1800-ft tunnel is all day, and ore is being run out to the mill. The latter will start in a few days, as soon as everything is in readiness to allow of a continuous run without interruption. The new company are working and surely, with a view of giving all preliminary arrangements completed, and before operations are commenced at the mill. The entire stock is owned by four persons, and their business is conducted as that of a well regulated private establishment, and the stock is not out on the market for sale.

**GOLD STRIKE.** —Never in its history has this substantial mine looked as well as at present, and from the indications likely to prove a worthy competitor of the Green Mountain. The new tunnel in the leaden portion of the mine has been struck in the rise from the first tunnel. The Wisconsin mill, with 15 stamps, will start up in a few days on ore from the Lawrence chute, which runs through the Bidwell tunnel. The 24-stamp mill running steadily on ore from the No. 3 tunnel. This mine keeps stamps in operation, and we have good reason to believe the mine could furnish abundant ore at least 100 stamps.

**A LIVELY MIN.** —Plumas National, April 9: Loring & Avitt have certainly found "the bonanza" claim of this district, and if they keep gaining as rapidly as they have, it is hard to estimate what they will take out of it. Wednesday the miners in the upper shaft picked up 100 nuggets, weighing respectively, \$100, \$50 and \$40, and the usual amount of finer gold. The returns for a week will probably exceed \$1,000. They have got the channel gold.

**COPPER ADJIN.** —We are told that the copper business to be revived again in Genesee Valley, and that a first-class mill will soon be erected to work the ore of the Cosmopolitan and Cooper mines. Just how much influence to put in the report we cannot tell, and simply let it for what it is worth. One thing, however, we do believe is likely to be true, the copper working can be made to pay, and there is copper ore enough in that section of Plumas to exhaustible quantities, and in many of the ledges a ore of a very high grade. The Light's Canyon country would also come in under the head of copper, and the copper belt can be traced through to the mountain Meadows, and possibly beyond.

**ANORVINE.** —Mr. E. A. Heath tells us that the mine is in first-class shape, and the results improving with every day's run. He has about \$200 for shipment. The power his mill is sufficient to drive three times the number of miners now running, and the new ones will be added soon as the roads are open and heavy freight can be bought in. The rock is low grade, paying about \$4 per ton, but it is easily mined and easily worked.

**MINING CHANCE.** —Mr. C. G. Rogers has assumed the proprietorship of the Cherokee mine, in connection with the Green Mountain, and Mr. E. Farlee will make his home at the Green Mountain in the future, and act as assistant Superintendent of that mine and the Cherokee.

**AN BERNARDINO.**  
SAN JACINTO DISTRICT. —*Colton Semi-Tropic*, April 9: In the San Jacinto district a company of capitalists have commenced operations, having a force of men at work. We have not been able to see any of the ore from this district, but have been told it is of high grade, both gold and silver. The country is full of prospectors and everything is lively.

**AN DIEGO.**  
PINACATE. —Dispatch from San Diego, April 12: Advice on the lately discovered Pinacate mines in this country, the San Bernardino line, show that there is considerable activity there. The San Jacinto Co. have about 300 tons of good ore on the dump, and are down 60 ft. The old Hope Co. claim to have \$40,000 worth of ore in sight. The Hoag Co. are running a drift, and taking out high-grade ore from a 10-inch vein. The Pinacate Co. are putting up a 5-stamp mill, and opening up several ledges. The Queen Co. are working a 3-ft vein, with promising prospects. About 200 locations have already been made in this district. Although placer mining has been tried on there by Californians and Mexicans for a good

while, it is only within about 3 months that the discovery of quartz ledges was made. It is said that the line of the California Southern railroad from San Diego will pass within a very few miles of these mines, and this people are building considerable hopes upon the prospect.

**SHASTA.**  
FRENCH GULCH. —*Cor. Shasta Courier*, April 9: There is quite an excitement here at present over the discovery of a very rich quartz ledge by the Gibson Bros. The ledge is situated on the divide between Saw Pitt and Summit gulches, about 5 miles from this place. The ledge shows very rich in free gold and is fully 5 ft wide. Prospects have been found along the ledge for a distance of over 1,500 ft. Several extensions have been taken that also show good prospects. Frank Wheeler is taking out some very rich quartz. The Washington Co. have just closed in a run of 132 tons that yielded \$18 per ton. Schaffer is taking out good paying quartz. Enoch & McManis are running a tunnel on an extension of the Washington.

**TRINITY CENTER.** —The mines are looking and paying well. Freethy & Coyle, of the Ella May mine, are getting big pay, and say they will soon be ready to go to French Gulch, for the purpose of looking up partners for themselves.

**SIERRA.**  
INDIAN HILL COMING TO THE FRONT. —*Mountain Messenger*: On the 21st inst. Bingham and Dixon, at the upper end of Indian hill, "lifted" a beautiful piece of pure gold weighing 38 ounces, of such purity and fineness that it will make over \$700 of United States gold coin. Several other larger lumps of the same kind were also taken out. This lucky find confirms the opinion that a rich ancient river bed courses from "Nigger tent" through Indian hill to Lager point, thence through the rich camps of Trinity Sierra to Pokor Flat.

**TRINITY.**  
TRINITY CENTER. —*Trinity Journal*, April 9: Trinity mines are paying well this season. The late rich find of Coyle & Freethy at the mouth of Hatchet creek bids fair to be a permanent mine. The hatchet is close to an ounce a day to the man. Good prospects are reported from several new claims in the vicinity.

Miners hereabouts, while still hydraulicking several hours each day, are putting in spare time cleaning bedrock and getting ready for the annual clean-up, which will close early this year.

**TUOLUMNE.**  
SONORA MIN. —*Tuolumne Independent*, April 9: The miners in the Sonora mine struck the vein on Thursday, 7th inst., in shaft No. 2, at a depth of about 50 ft. The vein, which is striped about 4 ft on top, shows very rich in gold and silver. Indications are very flattering.

**NEVADA.**  
HALL & NORCOR. —*Virginia Enterprise*, April 11: The north drift, 2400 level, has been extended 42 ft. Repairs to the incline, also the V bob, are being made.

**UNION SHAFT.** —The shaft has been sunk and timbered 9 ft during the past week. Repairing the shaft at the 1000, 2200, 2300 and 2500 stations.

**MEXICAN.** —On the 2500 level this joint Union Co. east crosscut has been extended 20 ft, and the joint Ophir east crosscut has been advanced 20 ft.

**UTAH.** —During the past week the incline has been sunk and timbered 10 ft. The ground in the bottom still continues hard.

**UNION CO.** —The Sierra Nevada joint wiazo has been sunk and timbered 12 ft, and the hoisting engine is now in operation at its top.

**CALIFORNIA.** —During the past week 465 tons of ore, assaying \$24.75, have been extracted and sent to the mills. The joint Co. Virginia east drift from the C. & C. shaft has been extended 33 ft. At the C. & C. shaft we are cutting out a hob station at the 2100 level.

**SIERRA NEVADA.** —Are equaring the station to sink the wiazo from the 2400 to the 2500 level for air connection, and are cutting out a station on the 2400 level to make a raise to the 2300 level for air connection. During the week 200,200 tons of ore were raised.

**VIRGINIA.** —During the past week 432 tons of ore, assaying \$20.20, were raised. On the 2300 level the up-raise to connect with the Best & Belcher wiazo has been advanced nine ft. Are cutting out a chamber for cooling station at the bottom of the raise. At the C. & C. shaft are cutting out a hob station at the 2100 level.

**CHERRY CREEK DISTRICT.**  
TEACUP. —*White Pine News*, April 9: The Teacup folks molded their first bar of bullion yesterday. Regular shipments will hereafter be in order from the Teacup. Between 14 and 15 tons of ore are daily run through the Teacup 6-stamp mill. Everything about it is running to perfection.

**TEACUP.** —A heavy draft was made on the miners working in the Exchange mine last Saturday. We believe this suspension will be only temporary.

**STAR.** —It is rumored that the Star M. Co. intend to put up a 10-stamp mill this summer at the mouth of the tunnel at their mine. Plenty of water for that number of stamps is available. It would make quite a saving in hauling.

**RESERVE.** —There is a reserve of over 300 tons of ore at the Star Co.'s mill, and though the mill is being run to its full capacity, the ore is still gaining.

**ESMERALDA DISTRICT.**  
EMERALD. —*Esmeralda Herald*, April 9: The Humboldt west shaft has been driven down to the level of the working well. Ex-Oov. Beahm writes from below that should the ledge continue as good as at present, down to a depth of 100 ft, a 20-stamp mill will be put up for the property at once. Supt. J. S. Mooney starts work again to-day on the New Esmeralda property. Several tons of ore from this company's mine will be crushed immediately, thus giving the public a chance to know how rich the ore really is. This is a measure in the hope of nearly 1,700 ft. and a new vein in laying in perfecting tiles, work was not commenced, as expected, last Monday on the Cortez mine, but will commence next Monday. The Centennial still continues to develop and take out first-class ore. The mine looks better every day. The Prospector is working its regular force of men. No change in the appearance of the mine. "Yaak" Gupta is prospecting the Rothelids. It looks well. Good ore is being found in the Silver Lining. The Magic is improving in appearance. The Del Monte is still shut down.

**EUREKA DISTRICT.**  
GROVES & BERTRAND. —*Eureka Sentinel*, April 8: Messrs Oliver & Salishury have been the purchasers of the Groves & Bertrand. The Sheriff's deed was passed direct to them yesterday. The consideration named in the deed is \$10,000, though it is pretty well understood that the price paid was \$50,000. Messrs Oliver & Salishury express a determination to work the mine themselves for a time before offering it to the market. They have faith that they can make it worth a million in a few months. The chances for a marked improvement are regarded as most favorable by those familiar with the property. Mr. R. D. Clerk will have charge of the mine. The first work in order will be to carry the main shaft down to greater depth, after which a system of crosscuts will be driven. All in all, the property has greater prominence to-day than any we know of in this section of the State.

**EUREKA TUNNEL.** —*Sentinel*, April 10: The Eureka tunnel has reached a length of nearly 1,700 ft. and is now within 100 ft of a point immediately under the summit of the mountain. It has been run for a long distance in shale, which, in this district, is always barren. A change has just taken place in the character of the formation, and Mr. Hartnett, the contractor, is sanguine that he will get through the shale belt within 40 ft. Once out of the shale ore bodies are likely to be encountered at any moment.

**FLOWERY DISTRICT.**  
ORE. —*Virginia Enterprise*, April 5: In Flowery district ore is being reduced from the old upper levels and

croppings of the Lady Bryan mine, from the Monte Cristo and from one or two other veins, keeping 8 or 4 water mills in operation. Through working in this way in Flowery they are able to get on the right track, and keep on it till the first they know they will one of these days tumble into a first-class bonanza. The old plan of working in that section was to get good prospects on or near the surface, then go away from the spot as far as possible and start a big shaft or tunnel, taking the chances of finding that which they should never have lost sight of.

**LIDA VALLEY DISTRICT.**  
RICH. —*Esmeralda Herald*, April 9: Rich ore has been struck in the Centennial mine, at Lida Valley. This mine is considered one of the best places of property in southeastern Esmeralda. The Andrews & Scott 5-stamp mill is running steadily on ore from the Centennial mine, owned by Peter Anderson. The old Lida Valley mill is undergoing repairs and will soon be in running order. A 30-ton test is to be made on ore from the Lida Belle mine as soon as the mill is ready. John Chiatovich, acting agent at a new well district, has several mines in Silver Peak and Palmetta districts, and put several men at work on the company's mines. The company mean to open up their properties and see what there is in them.

**MONTEZUMA DISTRICT.**  
FURNACE. —*Esmeralda Herald*, April 9: John Howell is erecting a smelting furnace, at Montezuma, with a capacity of 15 tons. He has let a contract to parties there to furnish 25,000 bushels of charcoal. A few men are prospecting the mines of Montezuma district.

**SILVER CANYON DISTRICT.**  
SILVER CANYON. —*White Pine News*, April 9: From Charley Sommerholt, just in from Silver canyon, we learn that the mill is shut down at present, but will start up again in about two weeks for a good run. A force of 50 men is to be put on the Blue Belle mine as soon as the snow goes off sufficiently to permit hauling to the mill. Two bars of bullion were shipped from there by Thursday's stage. Charley thinks the camp will be in good news this summer.

**TYBO DISTRICT.**  
TYBO MILL TO START. —*Eureka Sentinel*, April 8: The Tybo mill is to be started up the present week. It is hoped to keep it going in the future. Mr. English did not sell the property to New York, but will soon add some new capital and increase the crushing capacity of the mill to 100 stamps; so he informed a representative of the *Sentinel* a few days since. The mine abounds in low grade ore, and may be worked at a handsome profit with increased milling facilities. Better times, we hope, are in store for those who have stuck by Tybo.

**WHITE PINE DISTRICT.**  
MADRE CONNECTION. —*White Pine News*, April 8: On the 31st of March connection was made between the Eberhardt tunnel and incline. We learn that the people of Hamilton and Eberhardt "jubilated" on the occasion. Those White Piners are hopeful people; they never give up; they believe that Treasures hill yet has millions in it; and now that the tunnel is completed and good ventilation secured, Capt. Drake will direct all his energies to the work of discovering a bonanza.

**ARIZONA.**  
PIONEER DISTRICT. —*Pinal Drill*, April 9: Big strikes on the Belcher. —Strikes on the Pike tunnel. —Fine ore found on winz No. 3 of the Lewis. —Silver Duke is stopped on account of water. —On the Emma they have spent about \$10,000 in developing the incline shaft. —The Emma. The tunnel is 100 ft long and strikes the shaft at a depth of 80 ft. At the bottom of the shaft they have drifted along the vein for a distance of 60 ft. The vein is 3 to 4 ft wide, carrying copper, galena with silver. The owners are Duff, Gorham and others. —The Bebee is about 7 miles southeasterly from Pinal, on a good natural road. This remarkable mine has the top of its main vein exposed in the incline shaft, scarcely covered by the drift, and there it lays for a length of about 1500 ft, so that stopping can be done from the ft of the mountain. There is some work done to show the value of the ore, which is carbonate and galena in a formation of syenite and porphyry. The width of the vein is 5 ft, and more, on the top.

**GLOBE DISTRICT.** —*Arizona Sentinel*: Our mills are doing good work at present. —The Mack Morris is running steadily and making regular shipments of bullion. The Stonewall Jackson is also doing steady work on the rich ore body found in the lower level.

A Mexican was in town last Sunday exhibiting a nugget of gold weighing 6 ounces, for which he was offered \$80. It was found in the placers of Lost gulch, about 2 miles west of the Golden Eagle mine. He says that one can easily make \$6 a day in that locality by using a common sluice box.

Mr. W. B. Hellings is pushing work on the South Pioneer mine, in Mineral Creek district, with a full force of men. He proposes to ship his ore to San Francisco, which is *prima facie* evidence of its high grade. The shaft is down to water, and he proposes to put in a large steam pump as soon as practicable.

**NOBLE FROM GRO BLANCO.** —*Arizona Journal*, April 9: Mr. E. M. Thayer came to Tucson yesterday from Oro Blanco. He reports the mining prospects in that district as looking very well. There is not much gold just at present, owing to a scarcity of water. The Washaw mill has shut down because of this scarcity. In Old Gro Blanco they get water at 12 ft, but in the new portion of the district they have not yet made an effort to secure water by sinking. The gold mines are turning out well, and they get considerable gold by panning.

**SOUTHERN CALIFORNIA.** —*Arizona Journal*, April 7: Mr. Campbell has returned from a flying trip to Tombstone and Charleston. He reports the Sulphuret as booming. The water on the 500 level is perhaps a greater find to many of the miners than the splendid body of ore which has been disclosed. It is about eight ft deep, and can be utilized for mining purposes, and it is within the possibilities that this had settled the vexed question of an inexpensive and inexhaustible supply of that very necessary fluid. Mr. Campbell says the town of Hereford is making rapid progress. They are burning brick for the reduction works to be erected there, and the narrow gauge railroad, or rather the line for it, from Hereford to Bisbee has been staked out, and it is proposed to commence its construction immediately. The Neptune company has made another splendid copper strike in Montezuma canyon, and the company now intends to extend the railroad to that point.

**COLORADO.**  
FINE CRACK. —*Register-Call*, April 8: Kelley & Co. have tapped in the breast of the adit on the Setting Sun lode, in Enterprise mining district, a fine vein of both smelting and concentration ore.

**FOOT OR GR.** —The 50-stamp mill of the United Gregory Co., since its being remodeled, is full of ore. Six 5-stamp batteries are double issue, the remaining 4 being single issue.

**WORK.** —Work is to be resumed on the S. P. Chase lode, in Russell district, by one of the owners of the mine, who lately arrived from the East.

**ORE.** —The Con. Kansas mining company, Nevada district, are running 20 stamps of their mill on ore from the Kansas mine.

The owners of the Blue Diamond lode, Central mining district, are making arrangements to build a shaft-house over the working shaft.

**IDAHO.**  
A TRAW AT WOOD RIVER. —*Eureka Sentinel*, April 8: The latest dates from Wood river represent that the weather has been very warm and pleasant, and that the snow is melting so rapidly as to create a flood. Many gulches and creeks, and dry dry in summer, are converted into small rivers, which are difficult to ford or cross. In consequence, communication between the various towns is almost entirely broken. With good weather it is thought that the body of the snow will have disappeared by the 1st of May, up to which time it would be folly to start for the new El Dorado, except for those who know how to swim.

**LIVELY.** —*Yankee Fork Herald*, April 4: The fact that all of the mines of the Salmon river country are developing finely will soon create a boom that will not only be a big one, but permanent. Of all the mines that have been worked on during the winter there is not one but that looks and prospects much better than over before. The Yankee Fork is a great mining country, and we can safely say that, although it has been highly spoken of both in the East and West, it is even greater than those who have the least waited it suppose. There is enough ore now in sight to justify the erection of a dozen 20-stamp mills, and a general opinion is that several will be erected this year. As soon as the weather will permit experts to examine the mines some sales will undoubtedly be made, and Yankee Fork and Wood river will be the liveliest mining camps on the Pacific coast.

**WOOD RIVER.** —*Silver State*, April 3: L. A. Hall, Wells, Fargo & Co.'s route agent, passed through yesterday, on his return from Wood River. He said he got as far as Little Wood river, some 35 miles from Bellevue, but as no streams were running, in consequence of high water and bad roads, he had to return without getting to the cad of his journey and establishing an office at Bellevue. He says there are over 100 persons from different parts of the country at Blackfoot, awaiting the opening of the roads to the mines. He expresses the opinion that Wood River will equal, if it does not excel Lida Valley.

**MONTANA.**  
ANSELMO. —*Inter-Mountain*, April 10: Two years ago the Anselmo was hardly entitled to be called a prospect. A small incline shaft was sunk on the vein, showing a small body of ore of two grades. With a small force of men the sinking of the incline shaft was resumed, and when the incline had reached a great improvement was noticed in the richness and character of the ledge. At a depth of 70 ft the ore body was 2 ft wide and sampled 150 ounces. At this point drifts were extended east and west, which showed the vein to be regular, the walls well defined and the ore of a uniform richness. The value of the property thus being established, a whim was erected to facilitate development, and preparations were made to start another shaft 100 ft east. The amount of ore available for extraction is very large, and the mines are now being actively worked. The daily output is 15 tons. The ore is a black sulphuret, carrying native silver in profusion, and is being shipped to the Silver Bow mill for reduction. On this dump are 500 tons of ore, of which 300 tons are first-class, which mills \$275 according to certificates, and 300 tons of second-class ore assaying \$80, but which is not being worked at present. The Anselmo is now in splendid shape to insure a heavy and constant production. It has already produced over \$200,000.

**MOULTON.** —The gallows frame for the new hoisting works on the Moulton is about completed and will be put in place this week. When finished they will be the finest and only works of the kind in the Territory.

**HONOLULU.** —Work still goes on in the Honolulu. A contract was let this week to sink the main shaft to a depth of 75 ft. When this depth is reached a level will be run east in the vein. Some very rich ore was struck on Monday. The work is being done under the supervision of D. R. Beck and P. J. Conway.

**BOULDER.** —*Butte Miner*, April 3: The Boulder G. & S. M. Co., of Loganport, Indiana (at Butte City), is developing its property with great energy, having a full force of men working day and night. Large and valuable ore bodies are already exposed.

**MOULTON.** —The large 5-compartment main shaft of the Moulton mine last night had reached a depth of about 270 ft. A large force of carpenters is employed. Some are busy dressing timbers for a large "How's Truss" gallowa frame, the largest and only structure of the kind in Montana.

**BLUES WING.** —A Blue Wing, Beaverhead county, correspondent writes of a big strike in that district, as follows: "We struck his tunnel 155 ft under the mountain, has struck a tremendous body of rich ore, which the formation running north and south come together. It is a bonanza—the biggest thing struck here for a long time. Over 20 ft of an ore body is found in the contact between the lime and granite. The ore is rich and is what is termed 'antimonial silver ore.'"

**LEXINGTON.** —A superior quality of ore is hoisted daily from the old incline shaft at the Lexington mine. Work of extracting ore from the east level goes on regularly. The quality is first rate, and the quantity lifted daily averages about 16 tons.

**ALICE.** —Operations at the Alice mine, in all the workings, progress entirely satisfactory. No sensational developments are reported. In all the upper levels of the mine, from the 500 level up to the 100 level, the drifts and stopes are being energetically worked, and are producing an average daily output of ore, reaching about 30 tons. The ore coming out is dumped into the 20 and 60-stamp mills, mixed into suitable proportions for successful treatment, and comprising the different grades of ore found in the mine.

**BELL.** —The Bell mine is yielding about 30 tons of high grade ore daily, and there is no call to increase the yield at present.

**THE GREEN FLAG.** —The Green Flag mine is producing from 30 to 40 tons of ore daily, which is hauled to the Colorado smelter for reduction.

**THE GREEN FLAG.** —The Green Flag mine, located near the Dexter mill, has a good vein of ore opened that assays over 100 ounces of silver to the ton.

**NEW MEXICO.**  
SAL. —*Grant County Herald*, April 9: Some pretty heavy sales of Shakespeare mines have recently taken place, the most important being of the Superior mine. Jas. Carroll has sold a half-interest in this mine for \$75,000 cash, the purchaser agreeing to put in \$50,000 worth of machinery in addition to the purchase money. Of this machinery a 50-ton smelter is to be erected at Shakespeare, the site of the main reduction works not having been determined. The purchaser is the Merchants' National Bank, of Evansville, Ind.

**LONE MOUNTAIN.** —Wm. Brahm has an essay from his St. Paul mine, Lone Mountain district, which shows 710 ounces to the ton. The sample assayed was picked up from a 10-ton dump pile. We hear that eastern parties are now negotiating for Brahm's property at Lone Mountain, and that a sale will probably be effected.

**OREGON.**  
DITCH. —*Democratic Times*, April 3: From W. J. Savage, of Rogue river, we learn that work has been resumed on the main ditch that will run from a branch of Savage creek to some diggings near the residence of his father, which are supposed to be quite good. Savage Bros. are enterprising miners and discerning speculators. Savage, Jr., of Grants, Co. of Forest creek, was in town Saturday, who informed us that the miners of that section have stripped more ground than ever this season, and expect to do well.

**PROSPECTING.** —Anderson & Cook have been prospecting on Prairie flat with good success, having taken out \$6 and \$7 a day on several occasions. With a fair supply of water they could make out a large amount of gold.

**NOYES.** —Cleaning up is becoming general. The mining season will close earlier than usual. A larger area of ground than usual has been stripped this season. Dan Silva is now cleaning up at the Applegate Gravel Co.'s diggings, and good results are anticipated. Some partial clean-ups have been made at the Sterling mine, which are said to have resulted very satisfactorily.

**GRAND.** —Frank Hill left for Grand creek yesterday, to look after the interests of the English and Blue Gravel companies.

**ELLIOTT.** —Tom Brown reports that the miners of Elliott creek have done substantial work in spite of the freshets, and are now cleaning up.

**BAD.** —The much-looked for April showers are dilatory, and many of the miners will be unable to finish cleaning up this season in consequence.

**DITCH.** —Jas. McDougal will soon commence building a mining ditch from the head of the big bar of Rogue river to the old quartz mill site some distance below.



## Copper Smelting, Etc.

(CONTINUED FROM PAGE 242.)

## The Age of Bronze in Europe.

But did it commence in Europe? The best authorities say "No," and I think they establish their case. It is almost certain that the use of bronze was introduced from the East, either as a branch of commerce, or, as seems more probable, by the incursion of a powerful and warlike race, large in stature and better armed than the men of the stone age, who were consequently speedily extirpated by them. This inference is drawn from the bones found in bronze age tumuli. Prof. Rolleston tells us that "Hesiod (who is supposed to have written about 900 years B. C.), in his 'Works and Days,' had somehow become as much impressed with the vast size and brute strength of the bronze-using people as I have become from actual handling of the bones." He also says, "All this seems to me to point to a conquest of this country having been effected by bronze-using invaders, who came in great numbers, probably, as has been elsewhere suggested, from the Cimbric peninsula." The relics of this race prove that they were a people of higher civilization than the men of the stone age. During this age, true bronze alone is found; that is to say, an alloy of copper and tin; during the Roman period, lead was frequently introduced into the alloy, but during the same period bronze was not used for the manufacture of weapons or cutting implements; iron and steel had taken the place of bronze in the manufacture of swords, spear-heads, and the like.

It now becomes an interesting question to consider, whether, during the bronze age, the materials of which it was made were produced in Europe or imported into it? Sir John Lubbock says: "The impurities in the bronze indicate that the copper ore was not all derived from one locality, and lastly, the discovery of molds in Ireland, Scotland, England, Switzerland, Denmark, and elsewhere, proves that the art of casting in bronze was known and practiced in many countries. Under these circumstances, it appears most probable that the knowledge of metal is one of those great discoveries which Europe owes to the East, and that the use of copper was not introduced into our continent until it had been observed that, by the addition of a small quantity of tin, it was rendered harder and more valuable." It seems almost certain that Europe, at least, never passed through a copper age. Implements of pure copper are extremely rare; a few have been found in Ireland. Some of these are of doubtful composition, and one is supposed to have come from America, where, undoubtedly, an age of copper did exist. That, however, is explained by the massive deposits of pure copper which occur on the shores of Lake Superior, which bear evidence of extensive and very early working. The remarkable similarity of bronze implements, wherever found, is an additional proof of their early importation, and that they came from a common center of manufacture, although the existence of molds in various countries, as before mentioned, shows that the implements were also cast in those countries, probably to meet the special tastes of the persons who were rich enough to buy them; the manufacture was probably carried on by recasting bronze ingots brought from their distant source of production. This seems strange and contradictory in view of the existence of copper and tin in such abundance in Cornwall; but we have the distinct evidence of Caesar that even in his day these islands imported their bronze, in the often quoted words, "*Ære ventur importato*." Further, I am not aware that there is any record or remains of very early copper smelting in Cornwall, or elsewhere in England. I do not speak of Roman days; for I believe there is some slight evidence of copper smelting in the north of England in Roman times; but I speak of the times of the true bronze age—the men of the "round," "bell," "howl," and "cone" shaped barrows in which bronze, and not iron, is found.

(TO BE CONTINUED.)

## UNITED EFFORT FOR FROST PROTECTION.

The viticulturists of the St. Helena district are moving together to raise a cloud of smoke over their whole area when the thermometer falls threateningly low. At the last meeting of their club a committee was appointed to arrange for the united effort. All are to apply matches to the previously prepared piles of combustibles when the cannon is fired at the place of Mr. Krug. This is a business-like way of going at the problem, and we doubt not it will succeed. In case others may like to know of the materials to be used, we may note that the report of the meeting in the *Star* says that heaps of straw manure with grape brush are to be used, the fire to be kept smothered so as to send out volumes of smoke. Mr. Weinberger is experimenting with what they call "smoke cakes" in Germany, made of two-thirds sawdust and one-third coal tar (by weight). These when ignited make a heavy and effective smudge.

A few men have been placed to work in the Mayflower mine, the property of the Bristol S. M. company, by the Superintendent. This mine is under attachment and the men have been put to work against the wishes of the attaching creditors. It is very probable that again the month of May blossoms the affairs of the Bristol company will all be settled, and a force of miners placed to work.

## Irrigation Engineering.

Those who are familiar with the irrigation work planned and being carried forward by the State Engineer Department of California, cannot fail to appreciate its usefulness and wish it continued success. Interested in all measures calculated to advance the agricultural interests of the State, we have taken pains to make careful inquiry into the nature of the work performed in the past and that planned for the future, and make a few notes thereof for our readers.

It needs to be understood in the first place, that the department is divided into two distinct branches, one of which has for its work the engineering required in carrying out the public improvements under the "Debris Act;" the other, the investigation of the physical facts involved in the irrigation of our valleys. Their objects are thus diametrically opposite—though not conflicting—the one aiming to prevent overflow and drain a region of an excess of water, the other to supply arid lands, otherwise useless and uncultivable, with the water of which they are so deficient.

The support of these two branches of engineering is as distinct as their work; the one depending upon the funds levied by taxation and the debris act; the other maintained by direct appropriation as all other departments of the State are supported.

It is the irrigation branch of the Department in which we feel most interested, and to which we wish to direct attention. The objects aimed at in the irrigation investigation are briefly to ascertain by observations conducted through a series of years, the average volume of water discharged by the streams available for irrigation; to learn the extent and character of the land irrigable from each source of supply throughout the State, and the nature of the soil and subsoil with reference to their adaptability to irrigation. These soil studies are especially useful, and are outlined upon detailed maps of large scale which show the boundaries of the various classes of soil, the exact topography of the country, the ownership of land, position of all prominent objects, etc. In short, these maps, made up by direct examination of the ground and from all surveys available, are designed to be much fuller in detail than any of the county maps heretofore published, and while not pretending to the minute elaborations of the famous maps published by the Ordnance survey of Great Britain, which has been in progress for a century, they will, when published as they are intended to be, come nearer to them in the amount of information conveyed than anything a young State like California has ever before projected. These sheets, which are intended to cover first the irrigation districts of the State, will ultimately be carried over its entire agricultural area.

A map of the entire State, on a smaller scale than these detail sheets, is making rapid headway in the office, and will probably be ready for publication in 1882. This map, which is designed to be sold at cost price after publication, is expected to be as complete and accurate as it is possible to make a map with the information available.

The nature of the irrigation systems practiced in various parts of the State is being studied and compared with special reference to the quantity of water required under various conditions and any observed defect in any section tending to produce a partial failure in irrigation, whether arising from physical peculiarities of soil and climate, defective works, or defective laws and regulations, are made a subject of inquiry, with the design of pointing out the remedy and promoting the interests and extending the practice of irrigation throughout the State.

That a greater degree of interest is being awakened in California in the necessity and value of irrigation is apparent to every observer, and we know of no public work undertaken by the State of greater general value than the investigation conducted by the Engineering Department. We understand that it is the intention two years hence to prepare for publication a complete treatise on the subject, which shall be elaborately illustrated and embody a review not only of all that has been learned of irrigation in California, but a comparison with all the prominent irrigation works of the outside world, compiled from the latest sources of information. We trust that the importance of this work will be so fully appreciated that the appropriation given in support of this important department of State work at the present session of the Legislature, will be sufficiently liberal to carry it forward to an early completion.

FROM SILVER (AURUM) CANYON.—Jno. L. Robertson, Wm. Borthwick, Wm. Pryde and Geo. McNamara came over from the canyon Thursday. They say the mill has been shut down. The Blue Bell mine had not been reached at the time they left. The snow between this mine and the mill is about 30 ft. deep. The last run made by the mill was on ore of a high grade, and a substantial clean-up is expected. The ore so far worked has been taken from the Sadie L., which, though carrying some wonderfully rich ore, is considered nothing more than a prospect, so the fate of the camp cannot be said to depend on that mine. Two hundred tons of ore is said to be on the Blue Bell dump. —*Ward Reffer.*

## Wheat Shipping.

The shipping of California wheat to Europe has been progressing at a rapid rate during the last three months, and the amount of wheat and flour sent out during the first three quarters of the harvest year is larger than that shipped during any whole year preceding. The deliveries of flour and wheat at San Francisco from July 1st to April 2d compare as follows:

	1879-80.	1880-81.
Flour, qr. sks.....	1,489,700	1,765,400
Wheat, centals.....	10,506,000	13,087,500

Reducing the flour to wheat, we have the equivalent of 14,411,600 centals wheat this year to date, against 11,622,300 centals for the same time in the previous harvest year. Although this large amount has been sent out, there is abundance still remaining, and there are about two score ships now in port under charter to carry wheat. Thus our magnificent crop of 1880 is working off and will be well out of the way before the crop of 1881, which promises to be also immense, will be ready for the ships. There are certain points concerning the prospective carriage of wheat which are of great interest at this time. One is that San Francisco is in imminent danger of losing some of its prestige as a wheat shipping port, because of the heavy burdens which are laid upon ship-owners by the port regulations, etc. San Francisco has the reputation of being the most expensive port in the country to bring a ship into. This is unfortunate, because it ultimately works disastrously to our wheat growers who should certainly find nothing in the way of the cheap export of their grain. The Southern Pacific railway authorities announce openly that they intend to carry wheat eastward to the Gulf of Mexico, and many of the growers of the San Joaquin valley are looking forward to the time when their grain shall not come near San Francisco bay at all. Such a result would be no more than fair return for the restriction placed upon shipping here by the great cost of this port. But we are fearful lest a turning away from San Francisco may ultimately place the business so far in the hands of the railroad that there may be no more healthy competition between ship and rail which will prevail at first. It is an encouraging fact, however, that there seems good reason to expect a large fleet of wheat ships in these waters the coming season, as reports have already gone forth that another year of large production is foreshadowed. It is believed that the present tendency to use steam instead of sail in the short voyages between European ports, etc., will throw a larger number of sailing vessels upon the Pacific ocean for cargoes. The progress of the change from sail to steam is worthy of note. In the report of the Oregon wheat growers' meeting last month, it was shown that the shipping interest of each and every maritime nation shows a decadence in the number of sail vessels. The largest maritime nation, Great Britain, is a fair exponent of this. She has lost within the past three years over 500,000 tons register in sail vessels, and gained over 1,000,000 tons register within the same time in steamships. She enters this year with contracts for building a larger number of steamships than ever before, and whose average registered tonnage is very largely increased over any former year, very few going below 3,000 tons, while many run over 7,000 tons; for it has been demonstrated that the larger the steamship the more profit received. Norway, which had a fleet in 1879 of 7,982 sailing vessels and had only 306 steamships, added quite heavily in 1880 to the number of steamships with more being built and others to follow. While she has been building steamships she has not added to her sailing fleet, as it was demonstrated that steamships could be constructed so as to carry lumber cheaper than sail vessels. France has enacted a law offering a bounty to French owners building steamships in France, and therefore it is morally certain that a very largely increased number of steamships will be built in that country.

So long as we can have plenty of ships and a competing route to the Gulf of Mexico, California can produce wheat to advantage. It is when some of the several go-betweens which separate the producer and consumer arrange for an unfair amount of profit for themselves, that the price falls so low that the industry is threatened.

## REDUCTION OF SILVER IN CHARCOAL.—Dr. C.

F. Chandler mentions the following interesting item in connection with the reduction of a silver salt by glowing charcoal. When solid nitrate of silver is placed upon glowing charcoal, deflagration takes place, the result being that the silver is left behind in the metallic state. Dr. Chandler has noticed a curious phenomenon attending this reduction—namely, that the nitrate in being fused by the heat, sinks into the pores of the charcoal, and as each particle of the latter is replaced by the reduced silver, the structure of the original wood is retained. Dr. Chandler affirms that in this way he has succeeded in producing masses of silver weighing an ounce or more, which show most beautifully the rings of annual growth of the wood. In performing the experiment, the author recommends that a crystal of the nitrate be placed on the end of a stick of charcoal, and the blow-pipe flame be directed upon the coal beside it, to start the reaction. As soon as deflagration sets in, crystal after crystal of the nitrate may be added.

## A State Entomologist Wanted.

At the last meeting of the State Horticultural Society, Dr. Behr spoke of the necessity of having some authorized officer to whom the decision of disputes between the farmer and insect-pest officer could be referred.

Mr. Hatch suggested that some expression of opinion on this subject to the Legislature, in view of the coming extra session, would be appropriate.

The following resolutions were read and adopted:

*Resolved*, That it is the conviction of this meeting of the Horticultural Society that the services of a competent entomologist are required to give a proper effect to the provisions already made by the Legislature with a view to exterminate insect pests, which are rapidly destroying the orchard interest.

*Resolved*, That it is desirable that a professor of entomology be attached to the College of Agriculture.

*Resolved*, That a committee of this society be appointed to confer with a committee of the Regents of the University, with a view to bringing this important matter before the extra session of the Legislature, and securing, by an amendment to the Appropriation bill, a sum sufficient to provide for a professor of entomology at the State University.

*Resolved*, That all kindred horticultural and viticultural societies throughout this state be requested to unite their efforts and influence with us to secure the desired result.

The Chair appointed as the committee suggested in the resolutions, J. V. Webster of Fruit Vale, S. F. Chapin of San Jose, and W. H. Jessup of Hayward.

Prof. Hilgard and Mr. Hatch spoke of the establishment of a Chair of Entomology as really of more importance to the success of this law than anything else proposed.

Mr. Jessup said that it was very necessary, and the only reason it was not incorporated in the original bill was because they feared to defeat the whole proposition by asking too much and leaving open a chance for the objection that they were seeking to have too many fat offices created. Having got so much secured, he thought it could do no harm now to ask for this rest that they desired for the efficiency of this law, viz., a State Entomologist.

Prof. Dwinelle said that he thought \$2,400 a year would secure the services of a trained and practical economic entomologist from the East. Besides that it would need about \$1,000 a year for necessary expenses and \$100 for plates, and that \$3,500 could not be more advantageously invested for the general good and the advancement of a most important interest.

Mr. Webster said that a grave question arose as to whether the Legislature at the special session could appropriate money for an office not already created.

Prof. Hilgard said that it could only be done by appropriating an additional sum for the College of Agriculture, to be used for the purpose indicated.

Mr. Shinn said that the Legislature could lawfully appropriate money for any purpose which had already been made the subject of legislative enactment, but if it was new matter they could not.

## Soured on Stocks.

The boys were sitting around in Vic. Muller's saloon, talking about the hard times, and of course their conversation drifted into the stock market, and the Carson *Appeal* reporter untied his ears and took notes.

"Don't talk to me about stocks," said a little red-headed man. "If a man was to give me a point in the d— strap game I'd hit him right on the nose. I've swore off."

"That's the business," said another approvingly.

"Ever since I came to this country," said the first speaker, "I've been luckin' at the gams right along, loein' all the while. Stock dealin' is the slickest combination ever cooked up to rake a man's pocket. Highway robbery's not a circumstance. If I was to go down into Sierra Nevada and see a crosscut 200 feet long runnin' slap bang into a solid body of gold 999 fine and when I came out if a man was to offer me a thousand shares for my old hat here, bust me wide open if I wouldn't belt him on the head with a brick and freeze to the hat. If I ever get taken in again it's my fault."

The red-headed man walked off, leaving the crowd much impressed, and at the corner he overheard a man say to another:

"She's a huy; you bet your boots she's a buy."

"What's that?" said the hear, pricking up his ears.

"I was just sayin' that Sierra Nevada was a buy."

"Really think so?"

"The boys are taking in all the stock they can get on Pine street."

"You don't say so!"

"Fair's got control of the tunnel!"

"The devil!"

"Mackay's coming back from Europe."

"Holy Moses!"

"They've run a diamond drill into the two thousand, and she's richer'n hot mush. The true business rolled in sand. This is dead square—"

The red-headed man heard no more, but in a few minutes he was in a lawyer's office getting him to fix the papers for a mortgage on his house so that he could take a thousand shares on a margin before the next Board.

The Martin White company has acceded to the demand of the miners for \$4 a day. Superintendent Sweetapple informs us that the company had decided upon taking this course before the demand was made.



## THE ENGINEER.

## A Mammoth Engineering Project.

Lake Mackenzie is one of those "possibilities of North America" recently suggested. The lake would result from a proposed closing of the northerly outlet of the valley of the Mackenzie river, at the line of 68° north, and storing up the water of 1,250,000 square miles. And to this could be added the water of other large areas. It would be a lake of about 2,000 miles in length by about 200 of average width. Its surface would have an altitude of about 650 ft. above sea level. It would cover with one continuous surface the labyrinth of streams and lakes which now occupy the Mackenzie valley.

It would be a never failing feeder for the Mississippi. It would connect with Hudson bay and with the "great lakes," and also with the interior of Alaska by connecting with the Yukon and its affluents. By concurrent results and other "possibilities," it would become, during some months of each year, a navigable water, adding not less than 12,000 miles of communication to the Mississippi. It would complete the interior lines of river courses by connecting them.

Cutting the "divide" which now exists between the Mississippi and Mackenzie would do this. This work is small when measured by its results, and it becomes easy of accomplishment under the methods proposed. The connecting of the upper Mississippi with the proposed Lake Mackenzie could be easily made. The out-flow from such a lake, having a length of more than 2,000 miles from south to north, and draining a very wide range of altitudes and latitudes, would be a timely and enduring one. This lake would make possible and easy the straightening of the lower Mississippi. It would also contribute to the proposed ship channel from Cairo, Ill., to the Gulf of St. Lawrence, by the almost straight line which cuts the Wabash valley, the lakes Erie and Ontario, and the lower St. Lawrence. This commercial channel, receiving all the waters converging at Cairo, would complete the demand for a constantly open ship channel from the St. Lawrence to the sea by way of the Strait of Belle Isle. That demand can be complied with, and the shortest and best line of communication can be thus opened between the interior and the seashore.—*St. Louis Republican.*

**THE ARMBERG TUNNEL.**—The preparatory operations having been finished, the work of boring the great tunnel through the Arlberg has now actually commenced. This tunnel will be one of the longest in the world, though not so long as that of St. Gothard. So far the operations on the eastern side of the Arlberg have progressed very favorably. The rock there found is a micaceous slate, through which the contractors find it possible to advance at the rate of from three to four meters a day. On the western side, on the other hand, the advance of the tunnel is retarded and the operations frequently disturbed by the repeated downrush of large quantities of water. The contractors were warned before commencing the work that this was only to be expected. The geologists further advised that the tunnel should be carried through a lower stratum of rocks, which are of denser material and water tight, but their warnings were unfortunately disregarded.—*Swiss Times.*

**THE ISTHMIAN CANAL PROJECT IN 1521.**—Anyone who thinks the idea of a canal connecting the Atlantic and Pacific a new one is mistaken. As long ago as 1521, a Portuguese navigator, Antonio Galvao, proposed to Charles the Fifth to make an interoceanic communication by the Panama route, and in 1780 Nelson proposed a canal through Nicaragua. Von Humboldt took it up in 1804. The first work actually done was in 1841 by Henry de Puydt, who moved a colony to Honduras to dig a canal. This colony went the way of so many that had preceded it. A few years later Garilla and Cortinez were sent out by Guizot to study the matter, and pronounced the undertaking an impossibility. About the same year Louis Napoleon was solicited by the Nicaraguan government to lend his name to the undertaking, and did actually make an appeal to the public in a pamphlet entitled "Le Canal de Nicaragua." Thus it is that the isthmus has received a pretty fair pavement of good intentions.

**TUNNELING THE PALISADES.**—The tunnel through the palisades at Weehawken, for the New York, Ontario and Western railroad, is again in progress, after a temporary suspension on account of a slight deviation from the original survey. The cutting is through solid rock and is for a double track, the whole work to be finished within a year. Mr. Katta is the engineer in charge.

**SEWER IRRIGATION.**—The experiment of irrigating lands in the neighborhood of Paris, with water from the sewers, is said to be working successfully. Sterile tracks of land have been converted into fertile plains, while no increase in sickness among the inhabitants has followed, as was apprehended.

**TWENTY steel floor beams** have been laid on the Brooklyn side of the great East river suspension bridge, affording some conception of the future appearance of the finished structure.

## USEFUL INFORMATION.

## Wool-Velvet.

An extremely novel and interesting process has recently been discovered by M. Puech, of Mazamet, France, by which the wool on sheepskins may be transformed into velvet. Up to the present time sheepskins tanned with the wool on have only been used for mats, linings of coats, etc., and the wool not having been subjected to any preparation, is always matted or curled. Seeing that the innumerable fibers are naturally disposed in a most regular and perfect order, eminently fit for velvetting, M. Puech, conceived the idea of cleaning the skin and wool of all impurities, and of so preparing and dressing them that the hairs would be well preserved and not entangled one with the other, the occurrence of the latter contingency being, of course, fatal to the success of the operation. After long and continuous experiments success has been achieved in the following manner. The *modus operandi* is divided into ten principal operations, the first, second, third and fourth relating to the complete scouring of the skins on the wool side and cleaning them on the flesh side, and the fifth, sixth, seventh, eighth and ninth to tanning and preparing the skins so that the perfect adherence of the wool to the skin is insured; finally by the tenth operation the skin is submitted to special machines for preparing the wool like velvet.

The following are the ten numerically arranged and successive operations referred to as constituting the process:

1st. An ordinary water bath is prepared at a temperature of from 45 to 50 degrees centigrade, to which a scouring substance of some sort is added, such as crystal or soda salt, soap and so forth, in which the skins are steeped.

2d. If dry skins are operated on, such as come from America or other foreign country, they are steeped eight to ten minutes, but for fresh or recently slaughtered skins, three or five minutes will suffice. The skins are then passed to a pressing roller of sufficient power to separate the hurs, yolk and other impurities.

3d. The skins are then as quickly as possible, and while still warm, submitted to a heating machine of some kind. The object of this operation is to heat the skins to purify them of all foreign matters, and at the same time wash them thoroughly with cold, tepid or hot water, which is made to fall in abundance between the drum of the machine and the apron supporting the skin.

4th. The skin on the flesh side is then passed to this same heating machine, which cleanses it, renders it more supple, and disposes it to receive the tanning matter.

5th. The skins thus prepared are steeped about one hour in tepid water, or four to five hours in cold water, which operation completes the softening.

6th. They are then passed to a pressing roller to extract all the water and leave 15% to 20% of moisture.

7th. On the flesh side is applied, either by hand or mechanically, one of the known drugs composed *ad hoc* constituting the tanning matter. In order that the action on the leather may be complete the skins are placed in piles for five to ten hours, after which they are hung up to dry.

8th. The leather is now moistened with a rag or sponge, and the skins are replaced in piles for 5 to 10 hours to soften the leather and permit of cleaning the flesh side.

9th. The hides are stretched and then passed to the softening iron, always on the flesh side, and the skins are scoured and tanned.

There now remains only the 10th, or velvetting operation, which is effected thus: By the scouring and heating system the staple of the wool is perfectly preserved and each fiber is in place. It then suffices to pass the skin on the wool side to the gig machine, which replaces all the staples where they had been displaced in the tanning operation, and cause the skin to part with what little tanning drug it may contain in the wool. After this the skins are passed to the dressing machine, which commences to dress the wool, cards it also a little and prepares it for velvetting. The skin on the wool side is then gently sprinkled and heated with a rod by hand or mechanically. This is one of the most essential operations, as the wool being then damp the rod raises it and hastens the preparation of the velvet.

The skin has now to be dried and sheared with cloth shears or other apparatus having the same effect. The skin is then the velvet skin or sheep's wool velvet, the subject of this invention. If it is desired to color the velvet, it is after the fourth operation that the dyeing takes place, the other operations then succeed as has been described. If the color necessitates hoiling or temperature approaching it, which would be inconvenient in an untanned skin, the operation is performed after the seventh operation, and this seventh operation is renewed after dyeing and then followed by the subsequent operations.—*Universal Engineer.*

**PHOSPHATE DEPOSITS IN RUSSIA.**—It is reported that the results of recent geological explorations made in Russia, have shown that there exist in that empire phosphate deposits of sufficient magnitude to supply the wants of Europe for an indefinite period.

**CLEANING IVORY AND MARBLE.**—The *English Mechanic* gives the following recipes: Polished marble or alabaster, when soiled, may be cleaned with a weak lye of potash and soft soap. Muriatic acid is the best thing for removing iron stains; it should be applied with a rag, but if used too freely or too strong, will make the surface rough. The following is the best recipe for removing ordinary stains from ivory or marble: Dust-lime is mixed with the strongest soap-lye pretty thick, and instantly, with a painter's brush, laid on the whole of the marble. In two months' time wash it off perfectly clean, then have ready a fine, thick lather of soap (soft) hoiled in soft water; dip a brush in it, and scour the marble, not with powder, as in common cleaning. This will, by very good rubbing, give a beautiful polish. Clear off the soap and finish with a smooth hard brush till the end be effected.

**PORCELAIN STOVES.**—Russian immigrants have domesticated in Minnesota the brick-lined porcelain stove which everyone who has been in Germany associates with his residence there, and remembers kindly for the even and healthful heat which it diffuses, if not for its cheerful aspect. Since these stoves are air-tight, and hence economize fuel, their introduction in regions where coal and wood are scarce is a matter of importance. It has been found that prairie hay serves to produce a comfortable heat when burned in these stoves, and machinery for compressing it has been put on the market. No doubt the patriotic American who has been taught to crave the quick, fierce heat of sheet iron, will laugh at an apparatus which requires an hour to do its work, but half a loaf is better than no bread and an hour's delay is better than to freeze to death.

**SAW DUST FOR CAR WHEELS.**—The *Lumberman* says: We have been shown a model of a car wheel consisting of an iron rim of seven inches outward diameter one-half inch thick, fitted with a well-proportioned hub, the space between the hub and rim filled with pine saw dust, pressed in so solidly that we are ready to believe the assertion that resting the iron beams upon hearings, a pressure equal to 23 tons applied to the hub failed to develop any signs of weakness.

## GOOD HEALTH.

## Are You Really Clean?

The advantages of thorough personal cleanliness are only appreciated by a few, for most people are ignorant of what thorough personal cleanliness means, and consider ablutions which are confined to the face, neck, and hands all that is necessary. If one were to say to the average man or woman, "You are not clean," it is very certain the average man or woman would be horrified and feel insulted. It is a fact, nevertheless, that largely from ignorance, and partly from prejudice, we go through life "dirty," rarely, if ever, cognizant of the physical pleasure to be derived from perfect cleanliness.

Now, it may be asked here, not inopportunistly, "What is perfect cleanliness?" Briefly, let us describe it as that condition which enables the body to breathe with regularity and ease through the pores of the skin. Whenever the body cannot so breathe, we are not clean, and some internal disorder, more or less severe, is the inevitable result. A great many people are sick simply because they are dirty. Cleanliness, as it is generally understood, means that the surface of the skin is free from dirt. This, however, is not real cleanliness. To be really clean, not only the surface of the skin, but its pores must be free from dirt, furthermore the blood itself should be free from impurities.

It may be said with truth that dirt on the surface of the skin is not nearly so deleterious as dirt in the pores. This statement is proved by the fact that workmen engaged in labor where proper perspiration is induced are rarely unhealthy, simply because, though dirty in the ordinary sense of the term, the pores of the skin are kept constantly washed and clean.

Of this fact most of us are ignorant. Our ancestors in olden times were not so ignorant, and knowing full well that hot and cold water washed the skin, but not its pores, in order to keep themselves perfectly clean, used the hot air bath.

Interesting remains of the hot air bath exist in Assyria, Egypt and Morocco, and in the district of Lebanon, where the habits of the people have always been the same within the memory of man. We have abundant evidences that this kind of bath flourished centuries ago, throughout Europe, particularly in France and England. The North American Indians have a rude form of hot air bath, so also had the ancient Mexicans.

We are indebted to the Turks for the preservation of the bath as it was in vogue in ancient times, hence the name, Turkish bath. The Turks adopted it from their conquered enemies, the Greeks, and made no modification in its practice. During the middle ages, when a bigoted and rabid ecclesiasticism ruled Europe, and when "dirt" became a religious duty, this bath disappeared from use, and public attention was not again drawn to it till about fifty years ago, when David Urquhart, an enthusiastic and scholarly Englishman, who had resided

many years in Constantinople as a member of the English embassy, became convinced of the immense benefit its adoption might be to his own countrymen, and wrote a book upon the subject. Twenty years later, Dr. Richard Barter, a hydropathic physician, located at St. Anne's, in Ireland, took up Urquhart's ideas, went to work and constructed the first Turkish bath in Great Britain. From that time the movement spread all over Europe, and more lately all over this country.—*Food and Health.*

## Danger in Baby Carriages.

The physiological or hygienic effect of the baby carriage on the child has been recently considered by Dr. Henry H. Smith in a paper read before the Philadelphia County Medical Society. Inquiry among physicians tends to fully sustain many of Dr. Smith's conclusions. Divested of technicalities, the results of investigations are that important muscular functions are impaired, particularly those of the spine and abdomen, and that the growth and proper development of the child are greatly retarded by the constant or injudicious use of baby carriages. Other evils, such as impeded respiration, brain congestion, spinal concussion and inadequate digestion or nutrition, are adverted to in this connection with an emphasis which enforces attention, while other considerations are suggested full of interest to those who have the responsibility of bringing up children.

It is said that when a child lies down, as it usually does, in a baby carriage, during infancy, the muscles of the spine remain nearly at rest. When, however, a child lies on its nurse's arms, its head and upper extremities are balanced on its pelvis, thus calling into play the spinal erector muscles and those of the abdomen, together with those which control the lateral motions of the body. "Hence," the doctor concludes, "its exercise in preserving its balance prepares its muscles for the more steady action demanded of them subsequently in creeping, or more especially in walking."

To carry an infant is in fact to train it in balancing its head and shoulders, while the abdominal muscles, acting as flexors of the spine, compress the liver and other viscera, and aid in both respiration and the action of the bowels. Such infants are sooner able to sit alone, creep and walk than the supine product of the baby carriage. Their improved respiration assists the oxygenation of the blood, the waste of tissue ensuing on muscular action increases the necessity for repair, and we find increased appetite, with improved nutrition.

It has been contended that the carriages are beneficial by enabling the nurse to keep children longer in the air. The doctor considers that a nurse unable to carry the child is unfit for her duty. He says, moreover, that the infant is often neglected, and allowed to hang its head over the side of the carriage in a way to induce a certain degree of brain congestion, or is too often found in some position which in time may result in curvature or caries of the spine. Another evil likely to ensue from the constant use of the baby carriage is concussion of the delicate brain or spinal cord of the infant, caused by bouncing the vehicle over curbstones, a matter as severe upon the nervous system of the child as railroad travel has been shown to be upon the more matured organizations of the man.

While Dr. Smith fully appreciates the fact that the use of the baby carriage permits the poor, tired mother a little relaxation, and values it in cases of children recovering from illness, he believes that as a general rule the facts referred to are sufficient to call the attention to the abuses of "a custom that is by no means a necessity in the case of infants, or those under 12 months of age."

**HONEY** can be used in lieu of sugar for almost all kinds of domestic use. It has no superior in the canning and preserving of fruits, making strawberry shortcake, etc. Many persons claim that honey disagrees with them—makes them sick. This is a mistaken idea, and is owing to those persons having eaten honey mixed with the poison of the bee, bee bread, larvae, bees, etc., as the old-fashioned strained honey used to be. But the honey of to-day, such as is produced by intelligent bee-keepers, and bearing their own label, is pure nectar, free from all deleterious substances, and is by far the purest and most healthful sweet known. As an article for the table, both tasteful and ornamental, what can be superior to comb honey? This is now procured mostly in small frames, and is removed from the hives as soon as it is sealed, thus preserving its delicate whiteness. But for use in the cuisine, extracted honey is superior, as it is free from wax, being thrown from the comb by centrifugal force.—*Food and Health.*

**POISONED BY A PENCIL.**—Mr. Samuel Clarke, of Vassellboro, Me., has been in the habit of carrying a copying pencil in his coat-pocket. One day Mr. Clarke went to Augusta, and while in the city he purchased some troches for a cold, which he put loose in the pocket where they were constantly coming in contact with the lead. While returning to Vassellboro on the cars, he felt a tickling in his throat, and to allay the irritation partook of several troches. His tongue at once began to swell and turn black, and by the time he arrived at home he was deadly sick. A physician was summoned, who promptly administered antidotes for the poison. It is said that a piece of the lead of one of these pencils, half the size of a pea, will cause the death of a robust man.



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### Passing Events.

The Legislature is in session at Sacramento, but so far all it has done of interest to the mining community has been done by the committee which has inserted a clause in the appropriation bill giving \$6000 a year for two years to the State Mining Bureau. We have referred to this elsewhere.

Within the next two weeks or so hundreds of miners will change their location. Many are going to New Mexico, old Mexico and Arizona; and others to Idaho and Alaska. The Wood River mines are probably attracting more attention just now than any other section.

For this reason we are having engraved and shall publish next week a map of the Wood River region, which will give to miners a good idea of the new mining region. It will give locations of towns, roads, mines, etc.

San Mateo comes to the front just now as a mining county. People boring an artesian well there are said to have come on a deposit of silver ore. It is said that considerable ground has been honed for the mineral under it. They say the deposit is some 400 ft. down.

Los Angeles, San Diego and San Bernardino counties are also looking up as mining regions. In fact, the southern part of the State is "picking up" in this respect. There is yet a good field for prospectors which, in view of late discoveries, will no doubt be more vigorously prosecuted.

The warm weather of the week is the best assurance that spring is upon us, and soon the hills will be filled with busy prospectors in every direction.

THE IDAHO GOLD MINE, Nevada county, declared a dividend, No. 140, of \$7.50, the other day. A mine that can pay 140 consecutive dividends, of \$6 per share on an average, is a pretty good one. We will add that this mine is in California, and in a part of the county where other similar ones will develop in time.

### Wood River.

Numerous letters from the Wood River country are being published in various journals, in all of which the writers advise intending prospectors to stay away from there till after the 1st of May. There is now too much snow on the hills for prospecting, or for working to any advantage, or developing mines. The local papers say there is no more work for men who want to work for wages now, but from present prospects it is expected that many will find employment by midsummer. But few miners are working for wages. Those that are at work get \$4 per day. Mechanics get from \$5 to \$7 per day. It is said that men of moderate means can get interests in good mines in that region, for developing them.

All those interested in the Wood River region or intending to go there should look out and secure a copy of next week's issue of this journal, as we are preparing and shall then publish a carefully prepared map of the Wood River country, showing streams, towns, gulches, roads, mines, distances, etc.

The Wood River and Sawtooth districts cover an area of 75 by 100 miles, and there is a good deal of unexplored country in the region. The Oregon branch of the Union Pacific railroad will pass within 65 miles of Bellevue, and already the people there are counting on a narrow gauge branch to the town.

One correspondent says that the town of Bellevue contains about three hundred inhabitants, nearly all of whom are prospectors and miners, most of them broke. There are seven stores, five saloons, three restaurants, two barber shops, one lodging house, one tin shop, two stables, and two meat markets, but no hotel. There are not a thousand dollars in circulation in the town. Another says:

Many strangers are arriving in Bellevue; in fact, the town is full of men who are looking out for some place to start into business. Several business men have recently bought lots, and are preparing to build at the earliest possible moment. The great scarcity of lumber in all this country is working a great hardship on those who are desirous of building early this spring. Fifty thousand feet of lumber would find a ready market in Bellevue at \$80 to \$100 per thousand. The rivalry between the townsites has been carried to a pitch bordering on insanity.

The same correspondent (of the *Idaho Statesman*) adds in this connection that the new town of Marshal or Hailey, which a correspondent to the *Salt Lake Tribune* calls "Yip Yap," and says it is "in an old bed of Wood river, is situated on a nice bar well above high-water mark, and in a place that had some natural advantages over Bellevue, it being nearer some of the best mines discovered up to the time of its location last fall. But recent developments east of Bellevue will tend to strengthen that point materially. In fact, it now looks like there would be a good town in each place, and in all probability a city will spring up which will cover all the intervening space."

Another correspondent has the following paragraph in his letter: People not intending to go into business had better remain away from here until the middle of May or the 1st of June. Sleeping accommodations are limited, and no prospects of more until lumber can be brought in. At present there are only two new buildings going up—of cottonwood logs. The hotels and restaurants charge \$8 a week for day board, or 50 cents a meal. All lines of business are pretty well represented. On page 252 will be found the opinion of an Idaho paper on the subject of the time for going to Wood river.

### Locations by Minors.

Not long ago it was decided that a woman could take up a mining claim if she chose to do so. And now it is decided that a minor can take up one. For the benefit of the boys and girls we give the decision in full, taking it from *Copp's Land Owner* for the purpose:

Department of the Interior, General Land Office, Washington, D. C., Jan. 29, 1880.

FRANCIS CUNNINGHAM, Esq., Visalia, Cal.—SIR: You are informed that, in my opinion, the fact that the locator of a mining claim is under the age of 21 years does not render the location invalid.

J. M. ARMSTRONG,

Acting Commissioner.

A good many claims have been taken up by minors in this State, which were afterwards worked by elders, but we do not recollect of the question having come up in connection with the question of patenting the claim. Under the ruling, however, a good-sized Mormon family with two or three dozen children might take up a whole district, and nobody could prevent them. It would be no worse than the case of the "chronic locator," who takes up everything in sight, and does no work on any.

We are glad to see the Land Office officially give the boys a chance. There are many of them in various new mining camps who will be stimulated to try their hands at prospecting.

THE heretofore extensive wood business at Brown's Station, 22 miles east of Carson, is closed. No further contracts will be let, as all the wood in the vicinity has been cut. The clean-up for the season is 86,000 cords, worth \$602,000.

### Improvements on Claims.

"Improvements" on real estate are generally conceded to be houses, fences, outbuildings, etc., etc. "Improvements" on mines are different things, and what they constitute has been a mooted question. The United States laws require certain annual expenditures for improvements on mining claims. Most miners have concluded that these improvements must be in the form of shafts, tunnels, winzes or drifts. It seems, however, that roads and necessary work of any kind may be included in estimates of required \$500 annual expenditures. J. A. Williamson, Commissioner of the General Land Office, has decided that all improvements made upon a mining claim and having a direct relation to the development thereof, may be taken into consideration by Surveyors-General as a basis for certificate of compliance with the law regarding expenditures. In his decision the Commissioner says:

"Any building, machinery, roadway, or other improvements, used in connection with and essential to the practical development of the surveyed claim, will enter into and from a part of the expenditures for improvements, to which you are required to certify. Necessarily, however, improvements of the character indicated must be associated with actual excavations, such as cuts, tunnels, shafts, &c., so as to clearly show that they are intended for use in connection with the claims under consideration. Deputies should make full report of the facts in each case."

Under this ruling (for it is only a ruling, not a law) a man may buy a \$500 portable hoisting engine and put it on a claim, and the purchase will answer for his year's expenditure on the claim. Or, he may build a road to his mine from a mill in town, and make that serve for his expenditures.

In all probability this rule will be taken advantage of in some few instances to evade legitimate expenditure, but the wording of the ruling is such that Surveyors-General can exercise some discretion, so that with honest officials no harm will result. In many instances the rule will be of benefit to poor miners who can spend their money on their claims in a different direction from what they have been accustomed to.

### Misrepresentation in Mining.

We have, in compiling the mining news of the day from various parts of this coast, to exercise a good deal of caution in preventing careless or exaggerated statements from finding their way into our columns. We may not be always successful in this, nor are we able to vouch for the statements made. In compiling our "Mining Summary" every week we always credit the source from which we obtain the news. As it is mainly from journals published in proximity to the location of the respective mines, it would seem that the statements ought to be pretty nearly correct. But the reporter may be sometimes misled by interested parties, or not exercise proper judgment and caution in publishing the mining news.

Still there is a great deal published about mines that we do not care to copy. It is so often the fact that the people who write about the mines know nothing about them; that many very absurd statements find their way into print. And this is, naturally, the case in new regions where mines are found. The results of an assay serve as a foundation on which to build an imaginative prosperous mining camp, and one mine is made into a district. But it is the ignorance of which we complain; it is the deliberate misstatements with which we have no patience. Misrepresentation never does any good. It defeats its own ends. The following paragraph from the *Union Democrat* (Tuolumne county), expresses sentiments with which we heartily coincide.

"A quartz vein found a short time since near the Riverside mine has been reported as rich. It may be or it may not; if it holds out it will be a good paying vein; otherwise, otherwise. There are good mines in this county that are made no better by lying about them. Most of the reports of rich finds and big strikes are grossly exaggerated, or made out of whole cloth. If there is any one thing hard to get at it is the real facts about a mine. Owners will seldom give reliable information and imaginative people are easily fooled. Making a great story when a boulder is broken, or a six or eight inch hole in the ground dug and a piece of quartz found with mineral in it, is thought by some to be mining news. A good mine won't be hurt if it is lied about, and a bad one cannot be made any more valuable with all the lies that can be heaped upon it. A little more honesty on the part of owners and prospectors in the stories they tell will place them in a better position than they now occupy. A purchaser wants what they say corroborated before investing. Mining is a legitimate business, or should be, but there is so much misrepresentation that it is not classed with other enterprises that bear a higher character from being honorably represented and conducted.

THE Lane black sand mine at Randolph, Oregon, is being worked to advantage.

### The Mining Bureau.

We see that the revised appropriation bill contains an item giving \$6,000 annually to the State Mining Bureau for two years. This is mainly owing to the exertion of the Hon. Joseph Wasson, of Mono, one of the few members of the Legislature who takes any interest at all in mining or kindred subjects. In fact, the creation of the Mining Bureau itself is due to Mr. Wasson's persistent and intelligent labor. Gov. Perkins, in his inaugural message, called public attention to the fact that, while mining had done a great deal for California, this State had done very little for mining. Mr. Wasson thought it was time the State did do something in the interests of legitimate mining. After mature consideration and thought, he devised the plan of a State Mining Bureau, where a collection of ores and minerals could be made, and where information and data of value to miners could be obtained. He drew up a bill forming the bureau which was passed. Then the Governor appointed as State mineralogist, Mr. Henry G. Hanks, of this city, an accomplished assayer and mineralogist, well known to the mining community. Mr. Hanks, by well-directed efforts, has succeeded in making a very fine collection of ores and minerals in a surprisingly short time. In fact, the collection is so large that the present quarters of the bureau cannot accommodate a further growth.

The income which maintains this bureau is derived from a tax on the transfer of mining stock certificates, and owing to the falling off in stock speculations, the revenue has fallen off also. Mr. Hanks has, therefore, been cramped for funds. A part of the scheme of the bureau is to collect information on mining districts, processes, mechanical appliances, etc., etc., and to do this it is necessary of course to employ skilled assistants. Owing to lack of funds this has not been possible, since the whole income has been consumed in purchasing cases, paying rents, and salaries of mineralogist, secretary, chemist, and janitor. A large amount of work which Mr. Hanks hoped to have done he has therefore been compelled to defer for the present. Yet it is work which will be eminently useful to the mining community. He desires to obtain reliable information concerning all the various metallurgical processes in vogue, description of all the mining and metallurgical appliances, histories of the various districts of the State, and, in fact, everything which will be of use to the miners of this State.

Mr. Wasson saw that the Chief of the Bureau was unable from lack of funds to carry out his work on the scope proposed; and at the last session of the Legislature, he, at the suggestion of the Governor, introduced a bill appropriating \$10,000 a year, for two years, to the Mining Bureau. Owing to lack of time, the bill was not reached before the close of the session. The gentleman, however, with characteristic energy, brought the matter to the attention of the proper committee, and has succeeded in getting in an item of \$6,000 a year, for two years; which, while not equal to his expectations, will do a great deal toward the work in hand.

This money is to pay the salary of State Mineralogist and the rent. The regular Mining Bureau fund proper will then be left intact for the purchase of cases, payment of expenses of collection of statistics, Museum acquisitions, etc. New cases are wanted; more room is wanted. If the appropriation is passed, the Bureau will be moved to better quarters, where there is more space for displaying the collection.

If this appropriation is made, Mr. Hanks will be able to go on with the work outside the museum. He will obtain for his report a large mass of information, which miners will find useful and valuable. And this is to be practical information too, not so scientific or technically obscure that ordinary miners cannot understand it. If the plan Mr. Hanks has made, is carried out, the annual report of the State Mineralogist of California will be in demand, not only in this State, but in all regions where mining is carried on.

NEW GOLD PLACERS.—The new discovery of placer diggings on the tributaries of the Clearwater, Montana, is attracting considerable attention. The *Missoulian* says that Sam Morris has returned from the new mines and brings a favorable report. The mines are situated on the Clearwater, about twenty miles from Moose creek. It is divided into two districts, one called Niagara and the other Caledonia. According to the laws made by the discoverers and stampers each man is allowed 300 feet, and they all have taken up one claim on each creek—the discoverers being allowed two. There are about twenty men at present holding claims in the new districts, and there are quite a number of creeks of similar character emptying into the Clearwater lower down, and it is highly probable that considerable prospecting will be done in that section during the coming summer.

THE FIRST SAFETIES, those now in general use, were put on the cages of the Potosi in 1865. The first trial was made the same year by Sam. J. Curtis and Major Gillis, they occupying a place on the cage, and one carload of ore. The cable was cut, and the drop was scarce six inches.



## History of Gun Cotton and Nitro-Glycerine

[Written for the Mining and Scientific Press by E. M. Kissler, Secretary of the Union Powder Company.]

## Number Two.

In 1863 when the study of gun cotton and the attempts to apply it were resumed in England, Nobel made known his first attempts to apply nitro-glycerine practically. One of the greatest obstacles he encountered at the outset was the difficulty of exploding it when he wished it to explode (and also that it exploded when he did not want it to explode); but in 1864 he discovered how a mass of nitro-glycerine can be practically exploded by a blow, and Nobel was the first to initiate the explosion of nitro-glycerine by exploders (caps). He conceived the idea of applying as the explosive agency the heat and concussion produced by the detonation of a small quantity of fulminating preparation, strongly confined, as in a percussor cap, and closely surrounded by the explosive liquid; and to him belongs the merit of first applying an initiative detonation as an exploding agency.

Although the ready susceptibility of nitro-glycerine to explosion by an initiative detonation led to its use as a most powerful blasting agent, by whose employment great economy in time and labor could be effected, its liquid nature gave rise to grave disadvantages and dangers in the employment and transport of the substance, which were demonstrated by the occurrence of numerous disastrous accidents, and were not obviated to any effectual degree by the adoption of special precautionary measures, such as the transport and preservation of nitro-glycerine in the form of a solution in methyl alcohol, from which it could be separated when required by the addition of water.

Thus in blasting operations, the nitro-glycerine with which the hole was charged might flow into fissures in the rock, and extend to places where its existence would not be sus-

pected, and where it might afterwards be accidentally exploded during the boring of other holes.

we find an expressman driving up in this port of Bremen just before sailing of a large emigrant steamer, and throwing a large box filled with nitro-glycerine, down from his vehicle, which resulted in a very disastrous explosion. There are four cases where the persons handling the material were entirely ignorant that they were even touching nitro-glycerine, as in each case the manifests did not show what the boxes contained, and it is owing to the concussion which the liquid nitro-glycerine underwent in transit that these accidents happened. Mr. Nobel thinks that the manufacturers in those days were not aware of the immense influence which the metallic packing then used (tin canisters) exercises, even when enclosed in wooden boxes, on the liability of nitro-glycerine to explode by concussion.

At once the question presented itself to Nobel how to preserve the usefulness of this substance with its great explosive energy for blasting purposes and yet disarm it of its terrible danger in handling and transportation.

Here again Nobel's inventive genius made itself manifest in his discovery, by converting this highly dangerous and sensitive material into a substance, which, by maintaining nearly the strength of this liquid, possesses all the advantages of a safe, stable and reliable blasting agent, as compared with nitro-glycerine, with whose aid and assistance the wealth and prosperity of the Pacific coast has been materially advanced, and before whose thunderbolts the portals of our treasury vaults flew open as if struck by a magic wand, as a recompense to our hardy and adventurous miners, with whom it has become a by word—it is needless to say that by it is meant Nobel's dynamite or giant powder. It is not in the province of this article to enter into the details of dynamite, of which will be spoken later on, but it will revert to the history of development of gun cotton, this body being analogous to nitro-glycerine, and consequently the object will be to point out some of their analogies and discrepancies.

have as a consequence the great danger to which our soldiers would be exposed by drying it before its use, we do not see that it offers any advantages or even any saving over black powder."

Much shorter than in France were the experiments made with it in Russia.

After a few unimportant disasters during the first trials, the transport and sale of gun cotton was prohibited throughout the empire.

In England they were more persevering, and the experiments were continued till 1854, but they were abandoned also in consequence of spontaneous explosions, causing serious loss of life.

In Prussia the experiments were continued during a period of eight years, but they were abandoned on account of an explosion in a drying chamber.

More persevering and somewhat more fortunate was gun cotton in Austria, and the results obtained there led to its revival in England. It is owing to the Austrian, Baron von Lenk, who introduced an improvement in this process of its manufacture, that this explosive ever acquired any standing at all, as the gun cotton prepared after Lenk's process is said to possess more stability, and it is said that it can be kept in store during a certain length of time without decomposing. In consequence of these favorable results the Austrian Government appointed a commission in 1852. This commission continued during ten years its labors in a very searching and exhaustive manner, not only in regard to its manufacture; but also as to its action when transported, kept in store, its action in fire arms, small and large, was tried; its effect as a blasting agent was extensively gone into, and resulted in the following report:

"Gun cotton can be used as charges for heavy ordnance, small arms, and other hollow projectiles, and it is also adapted for conduits and mines in military warfare, and as a blasting agent it is better than gun powder."

Based on this report the Austrian government

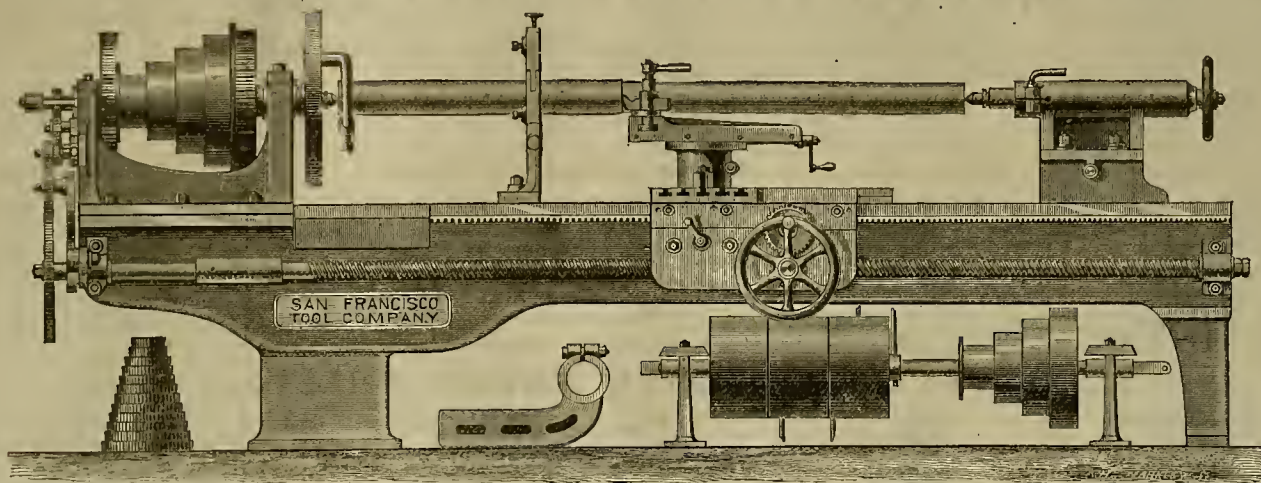
## Examining Mines.

Some of the Eastern capitalists are just learning enough of the science of mining to know there is a difference between rock and ore. Some of them have bought "mines" containing what was supposed to be "ore," but proved eventually to be "rock." But when they send such "experts" out to examine mines as have within the past year come to this coast, they can hardly blame any but themselves for losses they may incur.

The papers on this coast have continually warned Eastern investors to be careful in this respect. The experience the English people have had with mines in this country ought to be a warning. They sent men here to examine gold and silver mines, who had had only experience with coal, iron or copper mines. Men came who had been foremen or overseers, with practical experience of the details of mine working, but no experience of the general nature required to pass an opinion on a partially developed precious-metal mine. Another thing, there were too many of them of a class to whom \$5000 or \$10,000 was a fortune; and this, held alluringly before their eyes, made them express opinions more advantageous to the seller than buyer.

A consequence of these men being sent here to examine and report on mines was, that our English cousins got one good mine out of a dozen they bought. Still they put more faith in their own countrymen and kept on sending them.

The Eastern people are committing the same sort of errors. They seem to have more faith in a man who resides east of the Rockies, whether he knows much of mines or not, than they do in Pacific coast miners. The fact that a man styles himself "mining engineer," or calls himself a mining expert, by no means proves that he is one. Yet such men are



SAN FRANCISCO TOOL COMPANY'S GAP ENGINE LATHE.

pected, and where it might afterwards be accidentally exploded during the boring of other holes.

The majority of the accidents which have occurred in different parts of the world during the transport of nitro-glycerine are considered to have been due to its leakage from the packages; the great susceptibility of the liquid to detonation especially during hot weather or in tropical climates, would lead to the detonation of such portions by accidental concussion on comparatively slight blows, and disastrous explosions would thus be readily brought about.

Therefore, the main sources of the accidental explosions of nitro-glycerine we find in the reason of its liquid state, and the impracticability of applying a liquid in practice for blasting purposes.

Another source of difficulty and danger in the employment of nitro-glycerine as a blasting agent arises out of its property of solidifying (or as it is termed here freezing) at a comparatively high temperature, about 40° Fahrenheit, in which condition its sensitiveness to detonation is so very greatly reduced that special means are then required to insure its explosion. Its comparative inertness in the frozen state has led, on several occasions, to a recklessly rough handling of the material, which has resulted in accidental explosions. Moreover, the necessity of thawing the substance before it can be used with the ordinary means of explosion, has given rise to the incautious application of heat, and this has been a fruitful source of accident. Instances are recorded where frozen nitro-glycerine was actually put in a red hot stove, or cans filled with it put on live coal. As absurd as this statement will read, it is nevertheless true. The readers of this article will remember the explosion in 1866 at Aspinwall, where a West India mail packet was blown up, a wharf torn down, a number of adjacent ships injured and some lives lost, through the explosion of nitro-glycerine. Not long afterwards that a fearful accident occurred in Wells, Fargo & Co's express building in San Francisco. Later on, a Newcastle magistrate and several other persons fell victims to an accident with this explosive body. Still later,

Nitro-glycerine and gun cotton were discovered nearly at the same period. They are related in their production and in their properties, but their progressive history is entirely different, and a short sketch will not be amiss here. The discovery of gun cotton, by Schonheim, was hailed with delight by practical and scientific men, and immediately after its discovery great many experiments and trials were made with it on a large scale all over Europe, not alone by individuals, but by the different governments, who were inclined to adopt the new explosive for war purposes. But these sanguine expectations were not realized, which everybody seemed to have at the outset, and all the trials were finally abandoned, till of late years it was taken up again in England.

In France, as early as the 3d of February, 1846, the Secretary of War appointed a commission under the direction of the Duc de Montpensier, which included among its members some of the ablest men in France, like Piobert, Morin, the great chemist Palouze, who conducted all the experiments themselves. The result of their trials, extending during a period of three years, in which they entered carefully and extensively into the nature of the explosive, was a verdict of not favorable.

Numerous decompositions and spontaneous explosions, which had as consequences loss of life, were the causes of their unfavorable verdict in 1849, and all further trials with gun-cotton were abandoned in France.

They concluded their report in the following words:

"1. Fire Arms (*armes de guerre*.) In the present state in which this new material is produced by chemists, manufacturers and artillery officers, it is useless to continue to experiment with it in regard to its application to fire arms.

"2. Military Mines (*mines militaires*.) (For war purposes, in destroying bridges and fortifications.) As for its application in military mines, it would be impossible to furnish it to the military service, except in a wet state, by reason of the danger which its conservation presents in the dry state. Should it be even adopted in that wet condition, which would

ordered in the spring of 1862 the equipment of 30 batteries of ordnance, and three artillery regiments were appointed to be drilled into the use of the new explosives on a large scale."

The reports upon this new artillery material were very favorable, and the admirers of gun cotton had now a full right to expect its complete victory. But the change came soon.

On the 30th of July, 1862, a small magazine exploded on the Simmeringer Haide (the military drill ground near Vienna) which contained 2,800 lbs. of gun cotton; very soon afterwards, on the 15th of September, in a factory while twisting some gun cotton into a rope, the same took fire which communicated to a barrel filled with gun cotton, which exploded and killed two men. These two accidents destroyed the confidence of the government, and the Imperial Commission came to the conclusion, that the gun cotton produced up to that period did not possess the requisite stability for war purposes.

In September, 1862, it was ordered that those 30 gun cotton batteries should adopt gun powder again and gun cotton to be used only for Shrapnells. In the summer of 1865, a large magazine containing between 50,000 and 60,000 pounds of gun cotton exploded, there being no doubt as to the origin, spontaneous combustion, as all military magazines in Austria are kept most carefully guarded, which disaster had, as a consequence, the speedy abandonment for its further use, the cessation of its manufacture, and an imperial order for the destruction of all gun cotton stored anywhere in the Austrian empire.

Therefore, it is not to be wondered at if a strong prejudice exists in the Austrian army up to this day against this explosive. After its abandonment in Austria, gun cotton found an asylum in England, and although Von Lenk's persevering efforts to improve the manufacture and devise modes of application of the same, were not crowned with success, they have contributed vastly to secure to this material an important position in England, owing to Abell's improved mode of manufacture, where it enters largely into consumption as a blasting agent.

The writer of this article was at that time a student in Vienna.

apt to get employment by pushing themselves forward, while more deserving and competent miners are in the background.

There are plenty of competent men to examine mines without taking storekeepers, clerks, coal and iron men, and other people with scant knowledge of precious metal mining.

## Manufacture of Machine Tools in San Francisco.

We were pleased to announce last week that a new company, composed of some of our most substantial business men, had engaged in the manufacture of machine tools in this city. They have so thoroughly made their enterprise a local one that their own tools and appliances, except small implements and a cutting-off machine, will be made here.

Lathes, drilling and planing machines for the company's use have been made from their own patterns and drawings, at the Pacific Iron Works, and it is expected that orders for 16-inch and 24-inch lathes, drilling and planing machines can be executed in a few weeks from this time.

We illustrate herewith a 24 and 36-inch gap lathe from the designs of Mr. Richards, Superintendent of the company.

These lathes, as well as larger and smaller sizes, will be arranged with special reference to the kind of work and the method followed on this coast.

The company furnish free to applicants a pamphlet prepared by Mr. Richards, relating to "Modern Machine Tools," and in this may be found detailed explanations of the principles followed out in the designs for various standard machine tools, and also some account of the origin and progress of standard gauge-making in this country, a subject which we have already treated upon in this journal.

We propose to illustrate several more of the standard machine tools made by the San Francisco Tool company in succeeding numbers, and will then extend our remarks, when not encumbered by an introduction of the subject to our readers.



**A DAYLIGHT TUNNEL.**—Ed Dement and his partner Watt, who are mining over towards the South Yuba, scooped out a horizontal hole in the hill 40 ft. long and of various dimensions in height and width. The boys, not being very experienced at the business, were a long time about it, and many an old miner who stopped there to watch their operations was much edified when they glibly told how they were running a "funnel to hit the quartz channel" which some one had told them was just beyond. They estimated the cost of their tunnel by the amount paid out for candles while running it, and when they figured up the other night and found it had cost them five or six dollars a foot on that basis, they almost concluded to abandon it. Next morning, however, upon going to work they found the business had caved in its entire length, leaving an open cut. This would have disheartened most miners, but they look upon it as a blessing. The "open roof" will enable them to work in it by daylight hereafter, they say.—*Nevada Transcript.*

**HOW HE MADE A LIVING.**—Colorado Ike, the individual who blew into town on a high wind, was confidentially interviewed as to how he subsisted. Taking the questioner one side he said in a stage whisper: "I have got a good thing and I don't want it given away. I am a chlorider; I go into such mills as do dry crushing—for instance the Northern Belle mills—and stand around an hour or two, or sleep in the corners if I get a chance. When I come out I have the chloridethat sticks to me assayed and make a good thing out of it, you bet! Do you see that hat?" said he showing an old battered, whitty-brow hat; "well, there is more than three dollars worth of chloridethat in that hat. It had more in it, but Billy Farrell thrashed the dog yesterday and knocked about a dollar and a half out of it. Can you throw up for the beer?"—*Candelaria True Effusion.*

**STARTED UP.**—The furnace at Bullionville started up last Thursday, and is running as well as could be wished for and turning out considerable bullion. There are a large quantity of supplies on hand, and it is the intention to keep the furnace running as long as possible. These works were put up for the purpose of reducing custom ore, and just so long as they pay fair prices for ore they will control the custom business. There is one thing about the Bullionville smelting works that the chloriders admire. Just as soon as the ore is brought there and sampled the chloriders get their money. When it comes to paying, there is no "to-morrow" about Messrs. Godbe & Hampton.—*Pioche Record.*

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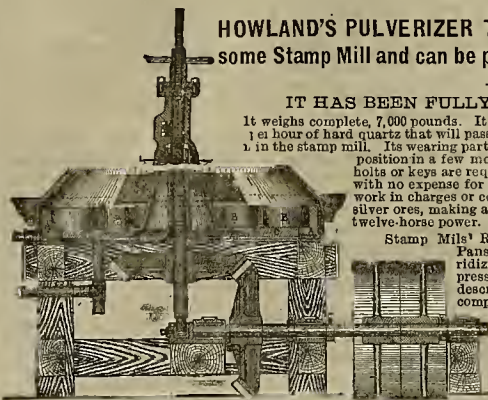
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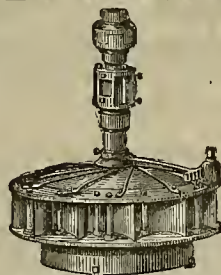
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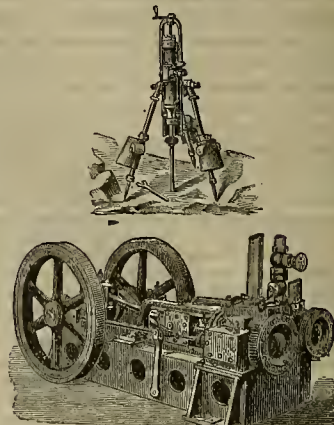
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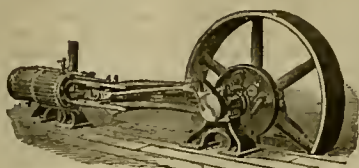
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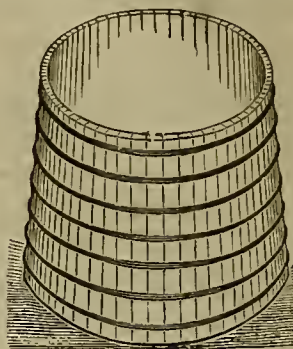
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING MARCH 29TH, 1881.

9,621.—FELLOW SHAM HOLDER—J. R. Adams, Oakland, Cal. (re-issue.)  
239,449.—ORE FEEDER—E. Coleman, S. F.  
239,453.—LUBRICATOR—J. Gates, Portland, Or.  
9,628.—BOON—J. Hohart, Nordhoff, Cal. (re-issue.)  
239,542.—REIN-HOLDER—J. S. Pitcher, San Diego, Cal.  
239,557.—SWITCH-BOARD—J. I. Sabin, S. F.  
9,629.—HORSE-CLOTHING, J. C. Simpson, Oakland, Cal. (re-issue.)  
239,365.—STEAM HEATER—H. Spence, St. Helena, Cal.  
239,450.—HOLDR FOR NUTS—E. Squires, Beaverton, Or.  
239,407.—TIRE USER—J. E. Tifen, Redding, Cal.  
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Recent Decisions Relating to Patents, etc

We give below brief abstracts of decisions\* rendered upon patent cases in litigation, for the benefit of our readers:

#### DECISIONS OF THE U. S. COURTS.

##### Allis vs. Stowell.

U. S. Circuit Court, Eastern District of Wisconsin.  
1. An infringement of a patent can only occur by the actual making, using or selling of the patented device.  
2. Doubtful as to whether a mere advertisement of the device constitutes an infringement so as to amount to a disobedience of an injunction.  
3. While the mere fact of the defendant's advertising a machine may not constitute a violation of an injunction, such advertisement would be regarded as very strong evidence that the party was transgressing the order of the court, and would justify a complainant in applying for an order for the punishment of the defendant for contempt of court.  
4. In proceedings for an alleged willful contempt a clear case must be made in order to warrant the court in exercising its power in the way of summary punishment. The case should be one that admits of no substantial doubt in the mind of the court that the party has intentionally disobeyed the injunction.  
5. When machines are sold prior to an injunction, and subsequently returned to the defendant, and again sold by him after service of a restraining order, there is probable ground for a claim of a technical violation of the injunction, from which the defendant can only be relieved by showing that the machines were not only included in the accounting, but that they had been paid for.

##### Dare vs. Boylston.

U. S. Circuit Court, Southern District of New York.  
An exclusive license, under agreement to render an account within a time specified, failing to do so, the patentee granted an order for an injunction to restrain the licensee from continuing to use the invention, and the licensee was held to be in contempt of court for failing to comply with the order.  
Held, That the time of the accounting was not of the essence of the agreement; that no harm had resulted to the patentee by reason of the delay; that no good reason for cancelling the first agreement was shown, and that the second license was valid.

##### Matthews vs. Chambers, et al.

U. S. Circuit Court, Western District of Pennsylvania. Decided January 15, 1881. Acheson, J.  
1. Patents 2,380, re-issue, and No. 44,684, construed to be for internal bottle stoppers which can pass easily into the bottle, and which are closed by outward pressure against a seal formed in the substance of the bottle itself, and hence not infringed by defendant's bottles, in which the internal stoppage is a plug of wood or glass closing by being drawn into a rubber ring placed in the neck of the bottle after the plug is inserted.  
2. Patent No. 44,684, claiming "making the entire stopper of such a length that it cannot turn over in the body of the bottle," is not to be read as embracing all manner of internal bottle stoppers having the specified length, irrespective of other distinguishing characteristics and modes of operation, as such feature is an old and well-known expedient and constructed so broadly the claim could not be sustained.  
3. The said claim, being limited by the specification to a stopper "formed as shown" is not infringed by defendants, even though their stoppers are too long to turn over in the bottle.

\* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

WHEEL HARROW AND SEEDING MACHINE.—F. Batchelor, Sacramento, California. This invention consists in the employment of a sulky or wheel frame, having independent bearing wheels supporting it by means of hangers, and a series of harrows traveling beneath the frame and between the wheels. Stay-rods extend from the hangers forward and to the center, where they connect with a vertical adjusting standard and with the draft bar. The draft is applied directly to the barrow as well as to the sulky.

TELLURIAN.—J. N. Mattick, S. F. This device relates to certain improvements in that class of apparatuses, which is intended to illustrate the movements of the heavenly bodies. Upon a suitable table is mounted an arm, having a globe upon one end representing the sun, and the earth and moon are shown at the other end of the arm by peculiarly arranged globes. These globes are caused to revolve and show the proper revolutions about each other by means of belts.

The Cherry Creek mines were found in 1872. They are 6,000 ft. above tide water, on the west side of Steptoe valley. A good tri-weekly stage runs in from Wells, 100 miles north. The best mine is the Star, which ships \$30,000 a month. It has from four to eight ft. of ore.

### Too Soon for Wood River.

"Our letters from Wood river show that the immigration is setting in at least one month, if not two months, too early. The snow is from two to three feet deep all over the country. There is no lumber and no saw mills in the country. A good many men could be employed in building if there was any material to build with. Bellevue and Ketchum are built up of rude log shanties, and small towns at that, no accommodation for boarding the men who are coming in, and nothing for them to do to earn a dollar. The snow is melting off and will be for a month or more, so that that teams cannot get into Bellevue before the first of May. The road will be soft and no hauling will be done in the towns, and very little into Bellevue, before the 1st of June. There are several saw mills, quartz mills and smelters ready to go in, and they will be got in and put up as soon as possible, but the chances for a day's work before the first of June is very improbable. As for prospecting or starting work on mines already located, it cannot be done before June. We have as much faith in that country as anyone, and would advise men to go there, but it is nonsense to go and board or beg, or eat up all the grub they can pack in, before they can do a day's work. A man can go from here to Bellevue by stage in three days and a half, or he can go there on horseback and lead a pack horse, or with a team, in five or six days, when the roads are ordinarily fair. They can go in the same time from Blackfoot to Kelton. In a week more they can get there from almost any part of the United States. There is nothing gained by the prospector in being there first. It is not like placer diggings, when one can afford to shovel through the snow and sink a prospect hole, nor is it like Leadville, in Colorado, where the leads are all in a bunch, like patch lead mines. Wood River is a big country, at least a hundred miles square, which may be set down as mineral bearing, and we believe the richest large belt of mineral bearing quartz that has ever been discovered. Men should go, to use a miner's phrase, tolerably well heeled. They should take ponies, and grub enough to last them two or three months, and some tools, if they intend to prospect. As soon as spring goods get in they can buy them cheaper than they can afford to pack them, but in that case they will want some spare money. The men who go there for day's work only, with only money enough to get them there, will be dependent on their friends, who have a short supply if they go before there is any demand for labor, which, as we have already stated, will not be before the first of June."

### The Mechanics' Institute Exhibition.

The Board of Managers of the sixteenth industrial exhibition of the Mechanics' Institute, which will open on Tuesday, August 2d, have issued the following rules and regulations, which we publish for the benefit of people at a distance who intend to exhibit:

The pavilion will be open for the reception of goods on Monday, July 22d. The exhibition will be open to the public on Tuesday, August 2d, at 7 o'clock P. M.

Applications for spaces should be made as soon as possible, and not later than July 25th, stating character of exhibit, amount and kind of space required—wall, table or floor. Blanks will be furnished for this purpose. All articles must be in place not later than August 6th.

Space allotted and not taken possession of by August 6th, may be assigned to others. The height of exhibits, on the main floor, must not exceed six feet for opaque objects, nor ten feet for glass or signs. On the partitions, outside walls, and other parts of the building, where light nor view will be obstructed, all the height desired can be taken.

If glass cases are to be used, state their size, height and particulars of the exhibit. This is important on account of light.

In Machinery Hall no rules can be given. The shaft is two and fifteen-sixteenths inches in diameter, has sufficient 30-inch pulleys for all requirements, and makes about 110 revolutions per minute.

The Art Galleries are lighted by sky-lights, with an unobstructed wall space from ceiling to floor.

All persons presenting articles for exhibition must have them registered by the Receiving Clerk, who will give a receipt for the same, which receipt must be presented when the articles are withdrawn at the close of the exhibition.

Articles intended for sale may be labeled accordingly, but cannot be removed until the close of the exhibition, except by written permission of the managers.

No charge of any kind will be made to exhibitors for space. Steam and water will also be furnished free in reasonable quantities.

Every facility possible will be given to exhibit working machinery to the best advantage. The name of every article must be attached by the exhibitor to it.

Perishable articles will be received or may be removed at any time during the exhibition, with the consent of the managers.

The most effectual means will be taken, through the agency of the police and otherwise, to guard and protect the property on exhibition; and it will be the purpose of the managers that all articles shall be returned to the owners

without loss or injury. Still, all articles deposited will be at the risk of the owners.

Spaces will be awarded as early as practicable (after the application has been received), consistent with the proper arrangement of the goods.

All articles arriving too early will be stored free of cost to the exhibitor, and the managers will have them duly placed in proper position for exhibition. No freight charges will be paid by the managers.

The Board reserves the right to exclude from the exhibition all things they deem objectionable, as noxious, articles of an explosive, inflammable, dangerous or offensive character.

### News in Brief.

ALL the accused Nihilists have been sentenced to be hung.

THOMAS CARLYLE left part of his library to Harvard College.

PRINCE PIERRE NAPOLEON BONAPARTE died at Versailles, of gout, last week.

THE iron-molders of Pittsburgh have secured an advance of 10% in wages in 40 shops.

A RATTLESNAKE, recently killed on Muletown mountain, Shasta county, had 30 rattles.

AN earthquake, which did no harm, was felt all over this State on Sunday morning last.

THERE is so much wrath against the Boers that it is now thought the English will resume hostilities.

EMIGRANTS to the number of 20,000 left Bremen, Germany, for this country since the 1st of January.

A TOTAL of 5,068 tons of coal was taken over the Seattle railroad from the 1st to the 6th of March inclusive.

THE advance of the French into Tunis excites great feeling among the natives, and war is regarded as inevitable.

A STAGE will be put in operation between San Bernardino and the Oro Grande mines about the 1st of May.

THE depth of the National ranch, San Diego, artesian well is 215 feet. It is in hard sandstone, and is still being sunk.

GOOD mahogany wood is selling in Eureka, Nev., at \$11 per cord, cedar at \$6, and mixed pine and cedar at \$7 and \$8 per cord.

IT is reported that there will soon be a reduction of force and salaries on the Virginia and Truckee railroad in all the departments.

IT is predicted by men interested in mining matters that there will be 5,000 men in the different mining camps of the Mobave, inside of two months.

SHEIK OREDALLAH has invited a number of Kurdish chiefs to be ready to invade Persia next month. The Porte is taking steps to prevent an invasion.

OVER 40 miles of Wood River valley, Idaho, is susceptible of cultivation. Game and fish are very abundant all over the Wood River and Sawtooth regions.

A PROMINENT cattle dealer of Washington Territory says that the range east of the mountains is starved for miles around with decaying carcasses of cattle.

THE travel over the Utah and Northern has increased wonderfully during the past month. All north-bound passenger trains go through well loaded, mostly emigrants.

THE Journeyman Painters' Association of Boston have decided to demand \$2.50 per day after April 11th, and that nine hours shall constitute a day's work on Saturdays.

ABOUT 70 men are employed at the foot of Webster street, Oakland, making the necessary preparations for the reception of the iron bridge for use of the Narrow-gauge company.

FROM present indications the run of salmon this season will be good, and in anticipation of an abundant catch there is great activity among the fisheries along the lower Columbia.

AN express train on the California and Oregon division of the C. P. R. R. was wrecked near Redding on Sunday. The engineer and fireman were killed, and a number of passengers injured.

THE Massachusetts Charitable Mechanics' Association has laid the corner-stone of what is destined to be the largest building in New England. It is on the Back Bay, and will have six acres of flooring.

THE constant fishing, in and out of season, of the trout streams of Marin county, has so completely exhausted the supply of fish in them that the Fish Commissioners are considering the propriety of stocking them with salmon.

THERE is a rumor going the rounds that Mrs. Mackay, wife of the Bonanza King of that name, has offered \$100,000 to Bishops Monogue and O'Connell for the erection of a cathedral in Sacramento, and the establishment of a Bishopric there for the northern part of California.

GOLD MOUNTAIN is prospectively the leading mining district of Esmeralda, and Esmeralda is prospectively the leading mining county of the State of Nevada. The coming camp is 220 miles from Battle Mountain, its present shipping point. And from this point 500 tons of freight were forwarded to the State Line mines alone during the past winter. From Hawthorne to Gold Mountain the distance is 120 miles, hence this new road has already accomplished a good deal in the way of annihilating teaming distance. So says the Esmeralda Herald.

THE Exchange mine, Cherry Creek, Nevada, belonging to an Eastern company, keeps eight stamps running and ships from \$10,000 to \$12,000 a month.

### By Universal Accord.

AYER'S CATHARTIC PILLS are the best of all purgatives for family use. They are the product of long, laborious and successful chemical investigation, and their extensive use, by physicians in their practice, and by all civilized nations, proves them the best and most effectual purgative Pill that medical science can devise. Being purely vegetable no harm can arise from their use. In intrinsic value and curative powers no other Pills can be compared with them, and every person, knowing their virtues, will employ them, when needed. They keep the system in perfect order, and maintain in healthy action the whole machinery of life. Mild, searching and effectual, they are specially adapted to the needs of the digestive apparatus, derangements of which they prevent and cure, if timely taken. They are the best and safest physic to employ for children and weakened constitutions, where a mild but effectual cathartic is required.

### FOR SALE BY ALL DEALERS.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performance. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce and valuable for future reference and library use.

The State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M., daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

### Metals.

(WHOLESALE.)

WEDNESDAY, April 13, 1881.

IRON—		
American, Pig, soft, ton.....	32 00	@ 33 00
Scotch, Pig, ton.....	26 00	@ 27 00
American White Pig, ton.....	—	@ —
Oregon Pig, ton.....	—	@ —
Refined Bar.....	41 00	@ —
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ 91
Norway, according to thickness.....	81 00	@ 91
STEEL—		
English Cast, lb.....	16 00	@ 13
Black Diamond, ordinary size.....	13 15	@ 15
Drill.....	9 10	@ 10
Flat Bar.....	—	@ 16
Plow Steel.....	9 10	@ 10
COPPER—		
Ingot.....	—	@ 52
Sheet.....	—	@ 25
Sheathing, Tinned 14x18.....	—	@ 42
Nails.....	38 00	@ —
Bells.....	—	@ 12
Old.....	—	@ 18
Bar.....	—	@ 22
Precipitate, 100 fine.....	18 00	@ 19
LEAD—		
Ingot.....	42 00	@ 5
Bar.....	—	@ 6
Pipe.....	—	@ 8
Pipe, soil.....	—	@ 9
Shot, discount 10% on 500 Bags.....	—	@ 2 10
Drop, per cwt.....	—	@ 2 30
Buck.....	—	@ 2 10
Chilled.....	—	@ 2 50
TIN PLATES.....		
10x14 1/2 Charcoal.....	—	@ 10 50
10x14 1/2 C. Coke.....	10 00	@ 10 00
Banca Tin.....	—	@ 25 00
Australian.....	—	@ 29 00
I. C. Charcoal Roofing 14x20.....	—	@ 10 00
20x28.....	20 00	@ 21 00
ZINC—		
By the Oake.....	—	@ 10
Zinc Sheet 7x3 ft. 7 to 10 lb, less the oake.....	10 1/2	@ 11
NAILS—		
Assorted sizes.....	4 00	@ 4 75

### Leather.

(WHOLESALE.)

WEDNESDAY, M., April 13, 1881.

Sole Leather, heavy, lb.....	30 00	@ 32
Light.....	25 00	@ 28
Jodot, 8 to 10 Kil., doz.....	36 00	@ 44 00
11 to 13 Kil.....	50 00	@ 55 00
14 to 16 Kil.....	65 00	@ 70 00
Second Choices, 11 to 16 Kil.....	40 00	@ 45 00
Simon Ulmo, Females, 12 to 13 Kil.....	52 00	@ 56 00
14 to 15 Kil.....	61 00	@ 65 00
16 to 17 Kil.....	67 00	@ 70 00
Simon, 18 Kil.....	61 00	@ 64 00
24 Kil.....	70 00	@ 73 00
Kipe, French, lb.....	1 00	@ 1 37 1/2
Cal, doz.....	48 00	@ 50 00
French Sheep, all colors.....	15 00	@ 15 00
Second Choices, 11 to 16 Kil.....	40 00	@ 45 00
Sheep Roams for Topping, all colors, doz.....	9 00	@ 10 25
For linings.....	6 50	@ 10 00
Cal, Russes Sheep Linings.....	3 00	@ 5 50
Best Legs, French Cal, pair.....	—	@ 4 00
Best French Cal.....	—	@ 4 00
Best Jodot Cal.....	4 75	@ 5 25
Leather, Harness, lb.....	35 00	@ 40
Fair Bridge, doz.....	45 00	@ 48 00
Saddles, doz.....	23 00	@ 37
Welt, doz.....	30 00	@ 36 00
Huff, ft.....	17 00	@ 20
Wax Side.....	19 00	@ 20

### Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending April 13, 1881.

HIGHEST AND LOWEST BAROMETER.

Apr. 6	Apr. 7	Apr. 8	Apr. 9	Apr. 10	Apr. 11	Apr. 12
30.077	30.125	30.115	30.068	30.111	30.066	30.169
29.930	30.077	30.019	29.986	30.066	29.983	29.988

MAXIMUM AND MINIMUM THERMOMETER.

58	57	59	65	63	61	60
50	48	48	49	53	51	52

MEAN DAILY HUMIDITY.

76.7	66.7	72.7	85	85.3	78	81
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PREVAILING WIND.

W	W	SW	S	W	W	W
301	332	134	239	198	257	239

STATE OF WEATHER.

Fair.	Fair.	Cloudy	Cloudy	Fair.	Fair.	Cloudy
02	02	02	02	02	02	02

Total rain during the season, from July 1, 1880, 27.78 inches.

### Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & CO.]

SAN FRANCISCO, April 13, 3 P. M.

SILVER, 1.  
GOLD BARS, \$90 @ \$10. SILVER BARS, 10 @ 18 1/2 cent. discount.  
EXCHANGE on New York, 10, on London bankers, 49 1/2 @ 42. Commercial, 50; Paris, 5 francs @ dollar; Mexican dollars, 90 @ 91.  
LONDON Consols, 1 09 1/16. Bonds, (4 per cent), 117 1/2.  
QUICKSILVER in S. F., by the dash, 42 1/2 @ 45c lb.



## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### REGULAR DIVIDEND NOTICE.

OFFICE OF

Northern Belle Mill and Mining Company.  
SAN FRANCISCO, CAL., APRIL 9TH, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 42), of Fifty (50) Cents per share, was declared, payable on FRIDAY, April 15, 1881. Transfer books closed on Monday, April 11, 1881, at 3 o'clock, p. m.

WM. WILLIS, Secretary.

Office—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

### EXTRA DIVIDEND NOTICE.

OFFICE OF

Northern Belle Mill and Mining Company  
SAN FRANCISCO, CAL., APRIL 9, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, an Extra Dividend (No. 43), of Twenty-five (25) Cents per share, was declared, payable on FRIDAY, April 15, 1881. Transfer books closed on Monday, April 11, 1881, at 3 o'clock p. m.

WM. WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

### DIVIDEND NOTICE.

OFFICE OF THE

Eureka Consolidated Mining Company.

Nevada Block, Room No. 37, San Francisco, April Fifteenth (15), 1881. At a meeting of the Board of Directors of the above named Company, held this day, a Dividend, No. Sixty-six (66) of Fifty (50) Cents per share was declared, payable on Wednesday, April Twentieth (20), 1881. Transfer books closed until the Twenty-First (21) instant.

P. JACOBUS, Sec'y pro. tem.

### DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company,

SAN FRANCISCO, APRIL 7, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 16) of Twenty-five (25) Cents per share was declared, payable on FRIDAY, April 15th, 1881, at the office of the Company Room 19, No. 328 Montgomery street, San Francisco, Cal. Transfer books will be closed on April 11, 1881.

JOSEPH NASIF, Secretary.

### DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, APRIL 2, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, dividend No. Twenty-seven (27), of Seventy-five (75) Cents per share, was declared, payable on TUESDAY, April Twelfth, (12) 1881, at the office in this city, or at the Agency of The Nevada Bank of San Francisco, in New York.

WM. WILLIS, Sec'y.

Office—Room No. 29, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

### NOTICE.

Annual Meeting of Stockholders for the Election of Directors.

Notice is hereby given, that a meeting of the Stockholders of the REPUBLIC MINING COMPANY will be held in accordance with the By-laws of said Company, at the office of said Company, Room 25, No. 310 Pine Street, in the City and County of San Francisco, California, on TUESDAY, the Nineteenth (19) day of April, a. d. 1881, at one o'clock p. m., of said day, for the Annual Election of Directors, and the transaction of such other business as may properly come before the meeting. Transfer books will be closed on Friday, the Fifteenth (15) day of April, 1881, at three o'clock p. m.

WM. J. TAYLOR,

Secretary of the Republic Mining Company.  
Office—Room 25, No. 310 Pine Street, San Francisco, California.

**Lewis Consolidated Silver Mining Company.**—Location of principal place of business, San Francisco, California. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Twenty-third (23) day of March, 1881, an assessment, No. Four (4) of Six (6) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. Gold Coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California.

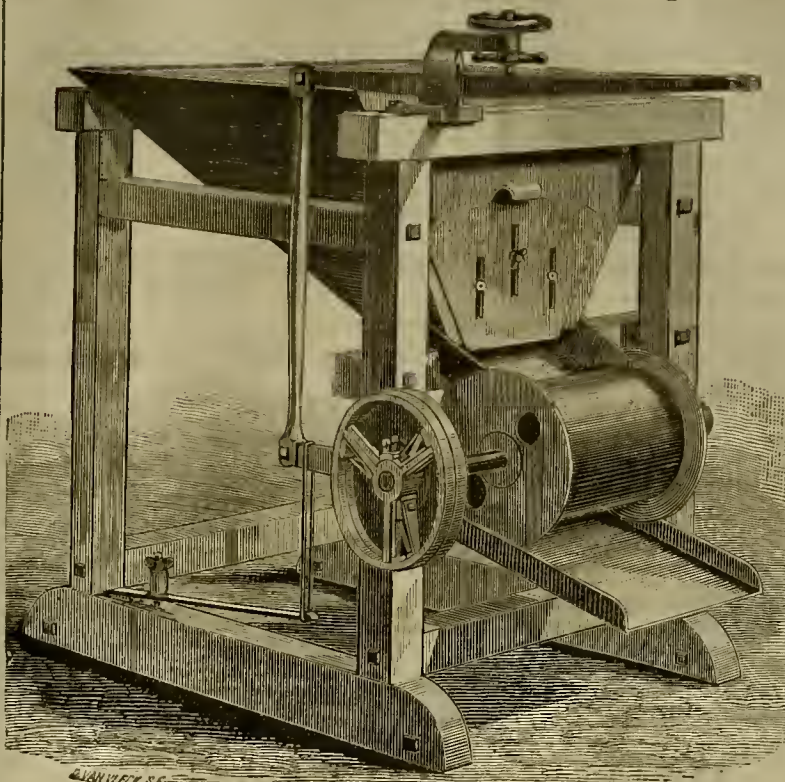
Any stock upon which this assessment shall remain unpaid on the Second (2) day of May, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Twenty-third day of May, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. PEW, Sec'y.

Office, No. 310 Pine Street, Room 15, San Francisco, Cal.

# THE "ROLLER"

## Ore Feeder for Quartz Mills.



The accompanying cut, illustrates the

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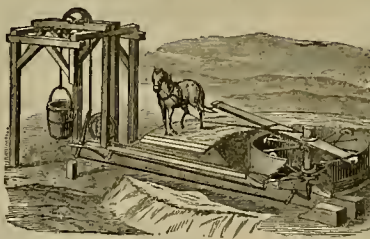
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Office, No. 240 Montgomery Street, San Francisco, Cal. It is with pleasure that we publish the following from prominent Architects in this city:

Believing that a journal of its kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally, and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Farquharson, Wright & Sanders, S. H. Williams, Thos. J. Welsh, P. Huernoe, John Marquis, B. McDougal & Son, Wm. Mooser, Wm. Curlett, Meeker & Banks, W. C. Hongland, S. & J. Newson, B. Hendrickson



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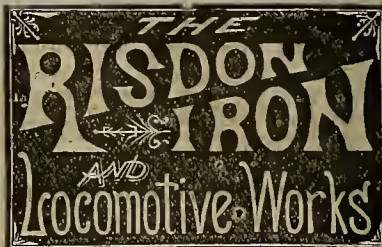
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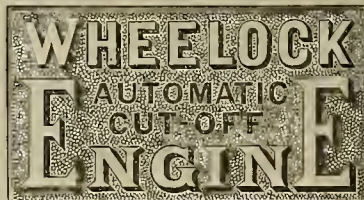
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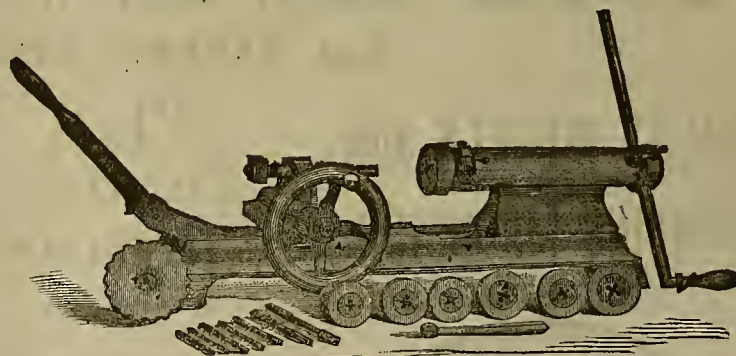
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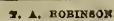
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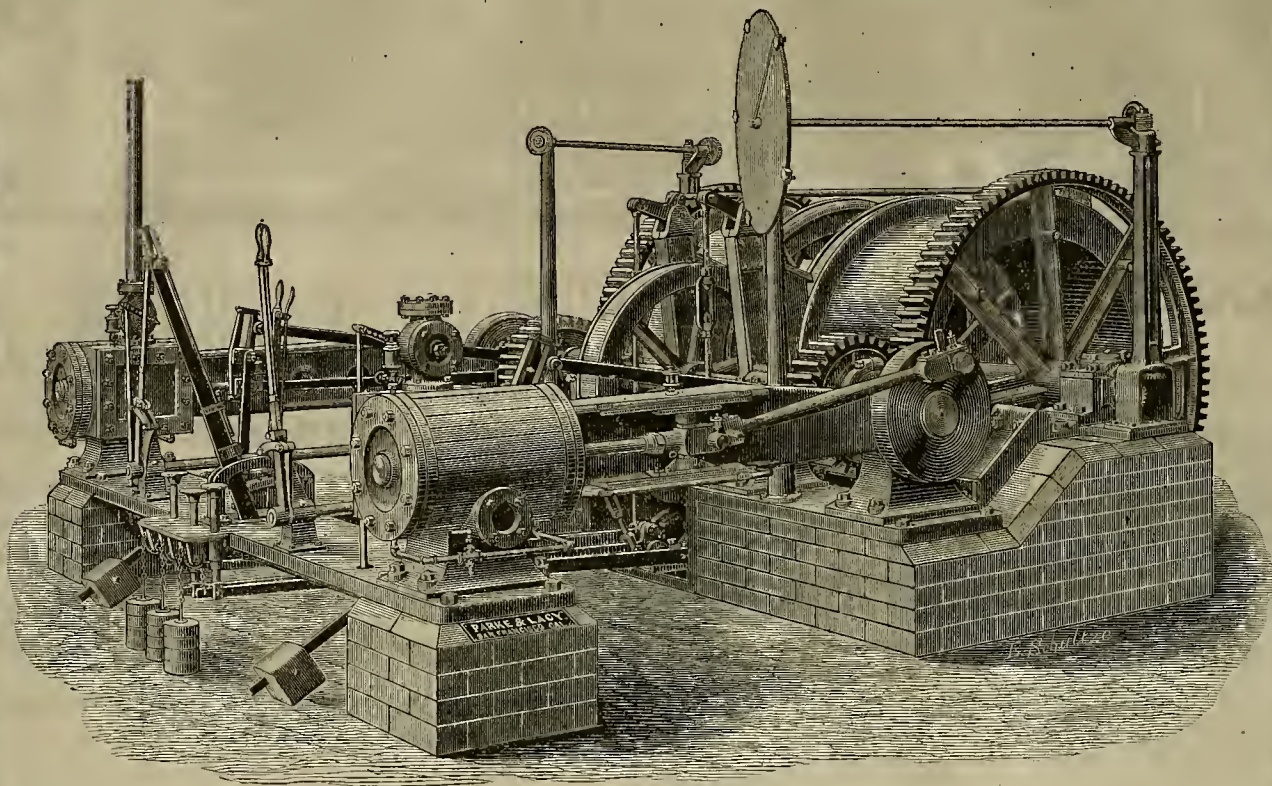


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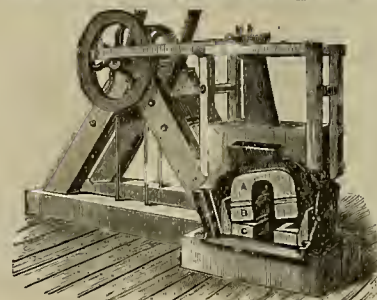
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, APRIL 23, 1881.

VOLUME XLII  
Number, 17.

## Wood River.

The Wood River region is now attracting more attention than any other mining section in the United States, and within the next few weeks several thousand miners will find their way there, many of whom have been waiting for months for spring to open in order that they might start. The *MINING AND SCIENTIFIC PRESS* has sent a correspondent to the Wood River region, and he is probably there now, and we shall shortly have full information as to developments. In the meantime we have had engraved from a drawing made by Mr. A. P. Turner, and kindly furnished to our correspondent, a map of the Lower Wood River, which we present on this page.

The map shows the location of the principal towns of the region, Bellevue, Ketchum and Hailey, the forks, creeks and ravines, the mines and roads, the timber and prairie lands, and the geological formation. It is a "sketch map," of course, but is sufficiently accurate for all practical purposes. The following information concerning the Wood River country we have compiled from various sources, and, having already printed a great deal concerning the region, our readers ought to be pretty well posted about it.

The whole Wood River country is well watered by Big and Little Wood rivers, fed by streams from every canyon and mountain gorge. The water power is sufficient for mills and mining; the mountains are well wooded with forests of red fir and black pine, spruce, etc. This is the country the Bannock Indians fought for several years ago, claiming it as a hunting ground. It is full of game of all kinds—elk, deer, antelope, bear, and the lesser spoils of the hunt, grouse and prairie chickens, while beaver, otter and mink abound. The smaller streams are filled with mountain trout, while the river has a seemingly inexhaustible supply of the larger trout and other fish. Owing to the elevation—5,500 ft.—agriculture may not prove practicable; but the numerous valleys of the mountains and camas prairies to the southwest are covered with hunch grass as thick as it can grow.

The Wood River miner, in speaking of this section, says that the Wood River region embraces several different districts, and is located in southern central Idaho, 130 miles west of the Utah and Northern Branch of the Union Pacific railway. The developments made during last season proved that belt after belt of argentiferous galena ore exist all the way from the low hills at the base of the Wood River range, northward, to the divide of Wood and Salmon rivers, a distance of 45 miles, and almost continuously from Bay Horse district, near Challis, northwesterly, to the south tributaries of Boise river. This makes one of the most extensive silver-bearing district in the world, being 20 to 50 miles in width and 130 to 140 miles in length. The ores are generally heavy galena, 50% to 80% lead, carrying 50 to 1,000 ounces of silver per ton, and of such a nature as to be easily and economically smelted. They occur in true fissure veins from one to four ft. wide. Prospecting has been done largely on horseback and in the most superficial manner, and many rich discoveries must yet be made if past experiences go for anything. Of 800 tons of ore shipped to Salt Lake City for reduction,

in 1880, a large proportion yielded \$100 per ton, above all expenses of mining, soaking, shipping and smelting, although freight alone from Bellevue to Salt Lake was \$37 to \$50 per ton.

The Mineral Hill district is ten miles west of Bellevue, and contains many of the best claims thus far found in the country. The Idahoan shows two ft. of solid galena, 75% lead and carrying 150 ounces of silver per ton. The Bullion is 135 ft. deep and shows a vein of \$150 ore from one ft. to six ft. wide. The May-

Bellevue; the Ornament, Ohio North, Oriental and Ohio South are the principal mines thus far discovered. The veins are from six inches to two ft. wide, carrying galena, chloride, gray copper and carbonates, yielding 600 to 800 ounces silver per ton.

Five tons of quartz stripped from the surface of the main vein at various points yielded \$3,500. These claims were all discovered by J. F. Boyle by the merest accident. His pony strayed away from Bellevue one night, and he hunted

North Star mine, bonded in November last for \$60,000.

Ketchum is 18 miles above Bellevue, on the east side of Big Wood river. Two and one-half miles east of Ketchum, on Eagle creek, is the Elk Horn mine, for which \$12,000 was paid last summer; 180 tons of ore shipped to Salt Lake sold for \$130 to \$140 per ton.

Warm Spring creek, properly the west fork of Wood river, is midway between Upper and Lower Wood River mines, and hence is sometimes mentioned as Middle

Wood River district. The first discoveries were made in May, 1879, and are named West Fork and West Fork No. 2. Both claims show from three to five ft. of galena averaging 100 ozs. silver to the ton. The Irwin has shipped 10½ tons, which sold for \$135 per ton.

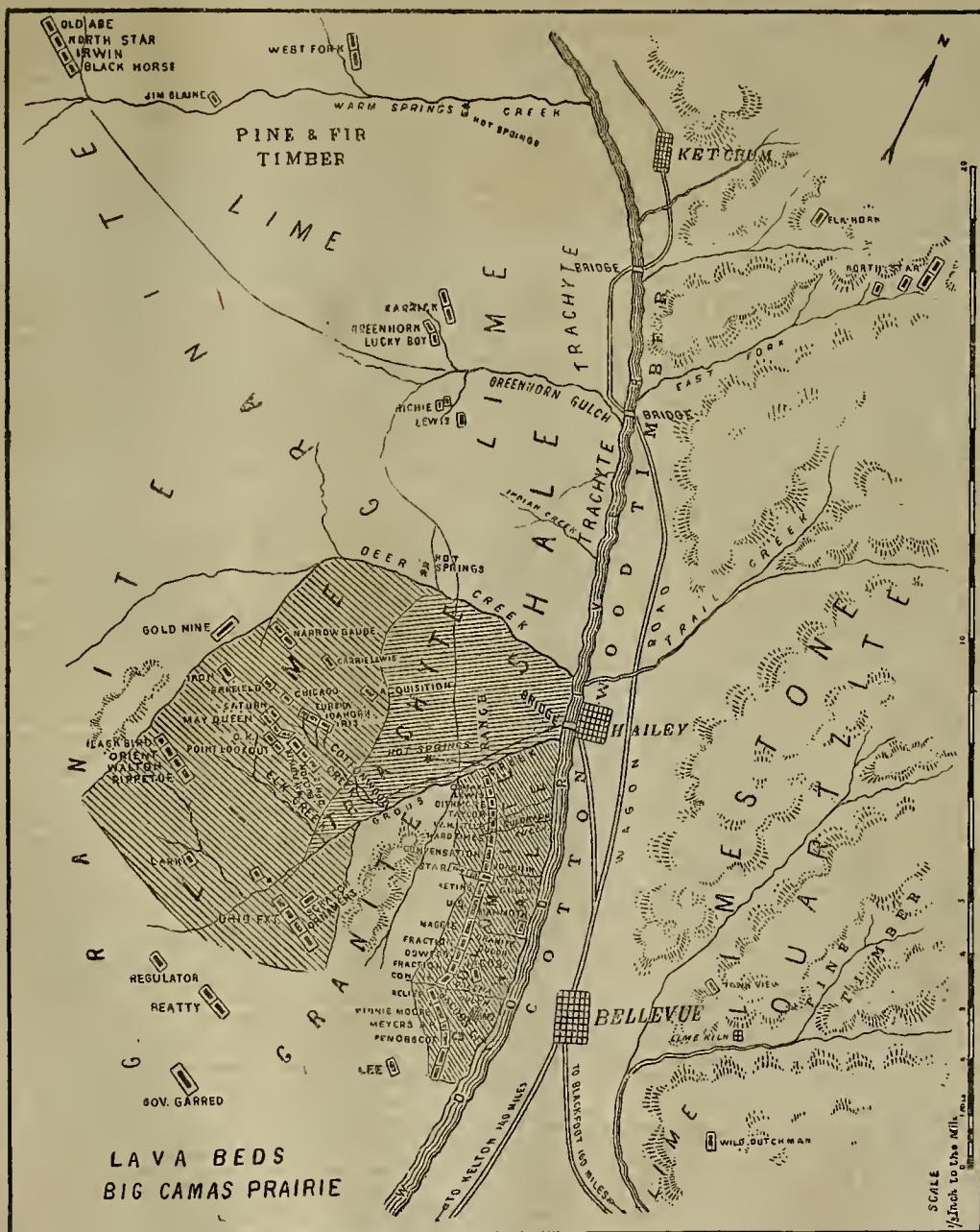
The Idaho has exposed a large body of antimonial silver assaying from \$80 to \$205 per ton. The Wood River is the adjoining location and shows a good body of ore averaging \$150 per ton. The Black Horse exposes 2 ft. of galena and antimonial silver, and assays from \$150 to \$275 silver per ton and 40% lead. The mines of Upper Wood River district comprise all those tributary to Galena City. There are in this region a network of veins, cropping out for 300 ft. and upwards. The Leviathan shows a vein of from 4 to 6 ft., and its ore assay \$210 silver, \$43 gold and 62% lead. The Kate May, Wahash and Last Chance carry about the same quality of ore—\$95 to \$143 silver and 62% to 75% lead.

There are many other districts showing fine veins of similar ores, and, in fact, the whole country is a network of mineral belts. The veins are so located in the hills that they can be easily worked by short tunnels, and the country rock—a limestone—contains all the elements required in smelting and in just the proportions needed for that purpose. The several smelters to be erected in the vicinity of the mines the coming season will insure a heavy output of bullion from this region.

Board without lodging is \$7 or \$8 a week. Supplies are short and will continue to grow scarce until the roads get good, which will be two or three weeks, at shortest. There is no beef in town, and very little bacon, flour, beans, etc. The buildings put up so far are of cottonwood logs. Lumber, when it can be had, is from \$60 to \$100, according to quality, but none is to be had at any price.

Several towns are laid out along the river above here. The first one is Hailey, started as a rival to this place. Many think it will be the principal settlement. Many enterprising men are in the scheme, and it may win, as Austin did over Clifton, at Reese river. The next to Hailey is Clifton, six miles from here, where the most noted mines, such as the Idahoan and Mayflower, are situated. The country rock at Bullion is lime and slate, it being principally lime at Bellevue. Eight miles above Bullion is Ketchum which has nothing but a good prospect to boast of as yet. The next place, 50 miles above here, is Galena, the country rock being slate. The camp was struck late in the season, but the work done during the winter goes to prove the existence of true fissure veins more certainly than at any other point. In the Galena mines the ore changes from base to free milling with depth, they say.

(CONTINUED ON PAGE 268.)



MAP OF THE LOWER WOOD RIVER COUNTRY.

flower is an adjoining claim of great richness. The Jay Gould shows a body of ore from 12 inches to 2½ ft. wide, running 200 ounces of silver to the ton. The O. K., Chicago and Garfield are valuable veins near by which have shipped rich ore. Five miles nearer Bellevue is a valuable group of mines, among which the Climax, Commodore and Minnie Moore are the most noted; they all show large, well-defined veins carrying ore worth from \$100 to \$200 per ton in silver, and averaging about 65% lead.

Boyle's district is five miles southwest of

industriously for him nearly the entire day following, cursing what seemed to be a very bad streak of luck. Finally toward nightfall, the truant was discovered, and, as Boyle was skinning around like a boy endeavoring to catch grasshoppers in his endeavor to grab the rope which the pony was dragging, he stumbled over the croppings of this rich ledge.

West of Boyle's district is a group of promising carbonate mines, showing ore assaying \$30 to \$100 silver per ton and 70% lead.

On the East Fork of Big Wood river, about half way between Hailey and Ketchum is the



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—E.S.

### Tintic District, Utah.

[From our traveling Correspondent.]

EDITORS PRESS:—Tintic district, situated on the eastern slope of the Ogkurrh range, about 80 miles south of Salt Lake City, was organized in December, 1869. It has as good mines as any part of this Territory, but their development has been slow and unsteady, owing to mismanagement. The great misfortune of Tintic has been that its best mines have become the property of timid and inexperienced Eastern men, foreign corporations with unscrupulous superintendents, or men whose better days have been devoted to shearing sheep and herding cattle. I noticed but very few exceptions to this rule.

In consequence of this state of affairs the work done has been merely superficial, or else the mines have been gouged out in a way that will render systematic developments extremely difficult when the district is delivered from its band of gophers. Just now the same odor attaches to Tintic as that which similar causes have brought on Owyhee.

The general formation of the district is granite, limestone and porphyry. Messrs. J. Q. Packard and Juab Lawrence are the principal owners in the Eureka Hill mine, which is noted for its rich horn silver ores that have assayed as high as \$18,000 to \$20,000. The work has been much retarded by lawsuits, but they are now employing a force of 20 men under the superintendency of Mr. John McChrystal. A depth of 400 ft. has been attained, and both milling and smelting ores are extracted that average 60 ozs. silver with 35% lead. This lode is in limestone formation.

The Mammoth M. & C. Co., in which Samuel McIntyre, Wm. McIntyre and A. C. Cunningham are the principal stockholders, operate the Christmood-Mammoth mine. It has reached a considerable depth and is now producing about 35 tons of ore per day. Some very rich pockets have been found containing free gold that milled away up in the thousands, but these are getting scarce, while the bodies of copper and galena get larger and more frequent. The company owns a rattle-trap of a mill consisting of 27 stamps, which is said to be made up of three separate mills of anything but modern construction, but then they are not noted for excessive enterprise in mining and milling matters, since their training has been in a different line. This property, in the hands of a California company, would be to Tintic what the Ontario is to Park City or the Horn Silver to Frisco, but under its present management it cuts a small figure and is of but little benefit to anyone but the stockholders.

The Mammoth Copperopolis mine and mill, owned by an English company, have been shut down for some time. The standstill is due to mismanagement by those who formerly had its affairs in hand. On the Sunbeam lode, which was the first discovery in this district, there are three incorporated companies, but no work is being performed at present. The Golden Treasure, owned by Marshall & Royle, J. E. Dooley and Alex. Graham, is in granite formation, and down about 380 ft. It is one of the best developed ledges in Tintic, having over 1,000 ft. of levels and producing about six tons of free milling ore per day. The ledge is about 20 ft. wide, assaying 60 ounces of silver with some gold. The mine now employs 12 men, and has turned out some 2,000 tons of ore that has been worked at the Tintic mill in Homansville. The Julian Lane is very similar in character of ore to the Golden Treasure, only not so deep. It is owned by S. P. Ely and G. D. Johnson, and only started up recently with five men, having been idle for sometime before. These gentlemen also own a 15-stamp mill, which soon will be running on their own ore.

The Caresa, belonging to B. Roberts & Bros., has also been idle all winter, but is again in full blast. It has a six-ft. vein of solid ore matter, averaging 150 ounces silver. One shaft is down 150 feet, but the ore is now being taken out of another shaft, which has as yet only been sunk to a depth of 30 ft.

The Northern Spy adjoins the Caresa on the north and is in limestone formation. This mine has made a wonderful record for itself since its discovery last October. A shaft has been sunk 100 ft. on the ledge which is six ft. wide, free millings, and realizing 70 ozs. silver and some gold. Five hundred tons have already been hauled to the Tintic mill, and on Christmas, or two months after this discovery was made, \$15,850 in bullion had been shipped. Fully \$30,000 has by this time been taken out of the Northern Spy and yet the total expenses on this mine, including tools, blacksmith shop, etc., up to date do not reach \$3,500. These figures speak volumes for the management of Mr. Alex. Graham, the owner and superintendent of the property, who is to be congratulated on the possession of a veritable bonanza. I can vouch for the correctness of these statements, having been given access to all the books and permission to examine the working assays made from the first start. One peculiar feature of this mine is that bismuth is found in numerous pockets of from 50

to 200 lbs. Mr. Graham now has about two tons of this valuable metal combined with silver, and thinks that his mine has produced more of it since October than all other Utah mines together since the Territory was organized. The assays show up to 55% bismuth with the average amount of silver.

The Tintic mill at Homansville is owned by the Tintic M. & C. Co., of Chicago. It is run by steam, has 10 stamps and 4 pans, 2 settlers and a smelting furnace of 20 tons capacity. The Tintic iron mines are very extensive, and their ores make the best flux found in this Territory. About 150 teams are now engaged hauling it to the railroad for shipment to Sandy and Frisco. Mr. H. M. Green owns a controlling interest in four of these iron mines. He pays from 85 cts. to \$1 per ton for breaking and placing the ore on the dump, where it is sold to the Utah Forwarding Co. for \$2 per ton. His ledges are from 30 to 100 ft. wide, and produce most of the flux now used in Utah smelters. One hundred tons will be the average output from his mines each 24 hours as soon as the roads get in better condition for hauling it away. A. L. M.

### Pinecarte Mining District, San Diego Co.

EDITORS PRESS:—Pinecarte mining district lies immediately north of the Temescal range, in San Diego county. A good wagon road connects it with Colton, 30 miles distant, which is the nearest depot of the S. P. R. R.

This district is comparatively a new one, but the developments now making evidence mines of considerable importance. These ores are, in no case, worked by Mexicans. Some 136 claims have been recorded; six of these prospects are down 35 ft. The veins contain free milling ore, run north and south in decomposed granite; have slicken-sides walls with a dip of 10°. They are easily worked with pick. Width of the veins vary from 2 to 20 inches at the surface and from 6 inches to 3 ft., 30 ft. below.

Gold runs in streaks, some of the quartz being rich, with good showing of coarse gold when horned, others showing but a trace.

Lawshe & White are down 35 ft., drifts north and south 60 ft. This is considered by competent judges to be good for \$250 a ton. The work of prospecting goes on in a lively manner. Several claims have been located on the ledge and more are being staked off.

#### May Queen

Is down 30 ft.; shows free gold. The report obtains that as soon as developments warrant, a mill will be erected.

#### Hoag Mine

Is in by tunnel 75 ft.; differs from others being worked, being in slate. Work is being pushed vigorously, with encouraging returns.

Taylor & Kendle are opening the vein by tunnel and shaft.

Kendle, Crittendon & Co. have just erected a 5-stamp mill which begins work this week. Should the out-look continue favorable, more stamps will be added. Lumber in the district can be had for \$25 per M. Labor commands \$2 per day. Wood, \$3 when delivered. Although mine owners are beginning to make the usual error of asking as much for prospects as mines are worth, yet quite a good opening up is looked for this season.

LEONIDAS TULLY.

April 15, 1881.

### Copper Smelting—Its History and Processes.—No. 2.

[By HENRY HUSSBY VIVIAN, M. P.]

It is indeed a most interesting question, Whence Came the Bronze?

Whether in the shape of celt, sword, spear, brooch, or ingot, which supplied those men with their weapons and ornaments? So far as I am able to form an opinion from the works I have read, I believe that it came from the East, and I agree with Prof. Rolleston in the opinion he expresses in that most able paper which he read before the Bristol and Gloucestershire Archaeological Society, "On the Three Periods Known as the Iron, the Bronze, and the Stone Ages," from which I am largely quoting, and to which I owe many thanks. Prof. Rolleston says: "Whereas was likely to be made the discovery of the advantages to be gained from alloying copper with tin, and so obtaining bronze? It was, of course, likely to be made in some district in which the ores of these two metals were to be found in proximity." When I say I agree in that, I must guard myself against being supposed in any way to assent to the theory enunciated by M. Wihel, that bronze was obtained by the direct fusion of an ore containing tin and copper. I will not detain you by any argument in disproof of what I regard as so absurd an idea; but I do believe that we must look to a district producing ore both of tin and copper as the most likely source of the discovery of bronze. Cornwall is such a district. But I have already stated my reasons for believing that Cornwall was not the primary source from which the bronze of very early ages was derived. No doubt exists that the Phœnicians, who were the great traders in tin between 1500 and 1200 years B. C., visited Cornwall, and purchased its tin, which they carried to the Mediterranean, and possibly also to Northern Europe; but I never heard that there was any reason to suppose that copper formed part of their commerce with Cornwall, nor indeed, as I said before, that copper was produced there in very early days. I think our friend, Prof. Rolleston, who

gave us so much pleasure and information at the meeting of the British Association here this year, has probably hit upon the most probable Source of the Early Production of Bronze, which he details at some length in the 7th, 8th and 9th pages of the paper I before referred to. His first shortly discusses Cornwall, and then turns to "Khorassan;" he tells us that Strabo, who flourished at the commencement of the Christian era, and in recent times Burnes, hinted at the existence of tin in that district, and he tells us that "the late illustrious Von Baer, but 12 days before his death, in 1876, published full and authentic information upon this subject in the *Archiven fur Anthropologie*, derived from a report procured by the Vice-President of the Imperial Geographical Society of St. Petersburg, Herr Semenov, as to the existence of tin, copper, and other minerals near Merv, Herat, and the Banyan pass. This report, which the Professor quotes, seems to establish the existence of rich lodes of tin and copper in that district, and they also state as a fact that many utensils of pure tin are made by the natives for household purposes. Herr Von Baer remarks: "This information makes it highly probable that the tin which enters into the composition of the many bronzes which have been found in Assyrian and Babylonian ruins came from the neighborhood of Khorassan." Prof. Rolleston then goes on to mention a third locality as another and, I think, even more probable source of early bronze, namely, the region lying between Birmah and Banca. He quotes a passage from M. Mortillet, in the *Revue d'Anthropologie*, in 1875, in which he says that "it is evidently there that the origin of bronze must be sought," and he points out the abundance in which tin occurs in the peninsula of Malacca and the island of Banca, together with the

#### Copper Production of the Archipelago.

The Japanese and Chinese both produce copper and cast largely in bronze, even to this day. When and how in the long vista of their history did these arts begin? We know that they regard our era of 1900 years, or that of Rome preceding it by 750 years, as things of yesterday; and we know that advanced civilization had existed among them long ages before Grecian and Roman nations had any existence. Dr. Percy tells us that a book is extant, written in Chinese and Japanese, which gives a most detailed description of copper smelting in Japan, and is illustrated with not less than 100 drawings, showing the perfection to which they had carried that process in early days. The date of the book is unfortunately not given. From the translation quoted, it appears that they go through almost precisely the same processes that we and all other copper smelters of the world go through—that is, roasting and melting the ore, roasting and melting the regulus, blowing it into copper, and refining. But perhaps even more remarkable than this process arrived at and described by the enlightened Japanese long ago, is an extract given by Dr. Percy, from an account of "Hindoo Copper Smelting," written by Mr. H. F. Blanford, of the Geological Survey of India (page 387). He says: "I witnessed the process, here described, in one of the southern valleys of Sikkim Himalayas, a few miles from the Terai. The workmen were Nepaules, by one of whom the little mine was rented from the government." Mr. Blanford then describes the dressing of the ore, namely, pure copper pyrites, which was effected almost precisely as the same operation is performed in Cornwall, and, indeed, in Europe generally, namely, first, a separation of the best from the worst by hand; then, after reducing this ore to a fine state, by washing in a "tye" with water, precisely as in Cornwall and elsewhere. The ore thus "dressed" is melted in a low hearth, the front wall only about six inches high, and the sides about one foot above the furnace-bed. The fuel is charcoal, and the blast is produced by bellows, made of a seamless bag of goat-skin, attached to a nozzle like a blow-pipe, made of clay; these rude bellows were placed one on each side of the hearth, and worked by a boy who alternately loosened and tightened his grasp as he raised and lowered the bellows. The nozzle was inclined downward to within three or four inches of the furnace-bottom. Dr. Percy then proceeds to give extracts from an account published at Calcutta in 1831, of the process of copper smelting carried on at Singhana in India, which appears to be almost absolutely identical with that described by Mr. Blanford in the Sikkim Himalayas, the only difference being that the ore was first mixed with cow-dung, formed into lumps, and burnt for 12 hours in heaps; this roasted ore was then melted at once into coarse copper, which, if the burning had been well done, would naturally be produced, probably with some regulus, which may have been overlooked by the person who wrote the account. The copper was then refined in a small vessel which received the blast of a single bellows. The notice ends with these words: "Copper smelting must have been carried on in this locality during a very long period, as the slags had accumulated to such an extent as to form a line of small hills several hundred ft. in length, and 30 to 60 ft. in height. There were four isolated stony hactions built on one of these artificial mounds."

I have ventured to trouble you at length with these

Accounts of Copper Smelting in the East. Because, as I before stated, I think there is good ground for believing that the production of copper began there in the remotest times, and I think it is most interesting to show that the natives, although utterly ignorant of scientific

metallurgy, yet nevertheless smelted ores of copper and produce that metal on precisely the same principles which prevail to this day in the most scientifically conducted works of Europe. I do not mean to assert that material differences in the appliances used do not exist; but I do assert that the principles involved in their practice and of European copper smelters are identically the same. I have no doubt in my own mind that the systems adopted at the present moment by the Hindoo, Musselman, Japanese and Chinese smelters, in those far regions of the East, are precisely the same as those which their forefathers used in the remotest times. I have no doubt that the copper which went to produce the bronze with which Solomon's temple was adorned nearly 3,000 years ago was smelted in the same way as that now practiced in the East, and that we may probably go back another 3,000 years, to the days of Zillah's son, Tubal Cain, and still with truth make the same assertion as to the process of copper smelting.

I have now dealt with the very early days of copper, the bronze age proper, and that which preceded it. Let us now come to

#### Roman Times.

We know that the, that is, bronze, copper alloyed for the most part with tin, was extensively used. We know that almost every sort of utensil was sometimes made of bronze. I don't very much whether copper, as a pure metal, was largely used even by the Romans. I have seen thousands of Roman bronze castings, but I cannot call to mind having seen one of pure copper. The reason is self-evident. All those objects of common use were cast; pure copper will neither cast sound nor fulfill the requisite conditions of hardness without being rolled or hammered; it is soft, malleable, ductile, but not hard and resistant. I think it also probable that the condition in which it left a Roman refinery, that is, like the German or Russian rosette copper, caused it to be especially unfit to be hammered, as it would be in what we call an "overpoled," and therefore not tough condition, and also very porous. Be that as it may, the fact remains that copper, as bronze, was extensively used by the Romans, and therefore that copper smelting existed at that period on a large scale. Whence did the copper come? We all know the fable that copper first came from the last but, I fear, not the brightest diamond in the British crown, the island of Cyprus, and that it even derived its name from that island; but it is not more probable that this island derived its name from the metal? for language began with man, and we can hardly doubt that copper existed in the far East long before the island of Cyprus received the advancing wave of Eastern civilization, bringing with it probably the name and knowledge of copper. We know as yet nothing of the copper-mines of Cyprus; but we know a great deal too much of the ancient copper mines of Spain. Last year, I visited the famous Rio Tinto and Tharsis mines, and found them covered with mountains of old slags, just as the often prophesied New Zealand may some day wander over and wonder at our Swansea slag-heaps. There is good reason to believe that these workings were Roman, and no one, looking at those heaps, can doubt the great scale upon which they worked, and the skill with which their operations both below and above ground were conducted. They rejected and left unworked the low-produced pyrites, but they followed eagerly the rich veins of yellow ore which traversed these mighty deposits. I saw the wonderful northern "face" of the great "Open Cast" at Rio Tinto, compact pyrites some 80 or 100 ft. deep and 1,000 ft. long, pierced at frequent intervals by ancient Roman galleries, following with true mining instinct the veins of rich ore. I examined critically the slag-heaps, and was astonished at the freedom of the slags, made perhaps nearly 2,000 years ago, from prills. At this moment, with all my accumulated experience of copper smelting, I don't know how they made those heavy iron slags so clean. I had but little time to examine the ground, and I failed to find the remains of their furnaces. I failed also to find metallic bottoms, the famous "Eisensamen," or "iron pigs," which almost invariably accumulate in the bottom of blast furnaces, working on ores of this nature, and which do now occur largely in the most scientifically conducted works of Germany and Sweden. Surely these "old men" knew their business!

(TO BE CONTINUED.)

BORING FOR OIL.—The Santa Cruz Sentinel says: Thousands of dollars are being spent in boring for oil in the mountains back of this city, in this Santa Clara county. Well No. 5, 10 inch bore at top, located in Moody's gulch, one-half mile from Alma, is down nearly 1,500 ft., and reduced to a 4½ inch bore. Well No. 3, is producing oil, some 30 barrels per day, and wells 1 and 6 are being forced down with all profitable speed. The men engaged in the construction and ownership of these wells are mostly old Pennsylvania oil miners, some of them have made and lost their hundreds of thousands of dollars in the oil business, and they express themselves as thoroughly convinced that immense oil deposits will be discovered in the Santa Cruz mountains.

THE MINING AND SCIENTIFIC PRESS, published by Dewey & Co., San Francisco, should be in the hands of every miner on this coast. It is only \$4 per annum and a bound volume for one year is worth twice the money.—Oregon Sentinel, March 5.



## MECHANICAL PROGRESS.

## Hand Skill and Machine Work.

There are plenty of opportunities in all branches of mechanical labor to notice the demand for skilled work in contra distinction to mechanical labor—the difference between the skilled workman and the experienced operator of machine tools. Just now, when mechanical business of all sorts is greatly driven, it is suggestive that in the best shops voluntary workers and would-be apprentices are denied opportunity, and good, experienced men are in demand. One case came under observation recently, where a well-known skillful shop machinist had no less than three good offers, either of which would have been considered, in ordinary times, or state of business, as good. That he was known as a valuable man in the shop, a handy man, capable of "taking a job," gave him a choice in one of three first class establishments. The fact is suggestive to learners—apprentices—and shows them that a merely routine workman is not always sure of employment, and that a sensible, judging and competent workman can make his choice of position and largely influence his remuneration.

There has been so much talk and "blowing" out reproductive machinery and self-acting tools, that it is almost a revelation to know that a skilled workman still holds his own and was at the master of the industrial forces. No inventor or improver can bring his invention or improvement to fruition without his aid; and he who supposes that to run a machine, or operate a tool makes him a thorough mechanic makes his vacation.

There are plenty of opportunities in the shop for the good workman. Indeed, now, when there is such a demand for dispatch in the turning out of finished tools and good machines, the man who can manage a job and bring incongruous parts into a harmonious whole is the man required. Those who can carry out the designs of the draughtsman and the ideas of the inventor are in demand, and in almost every instance of this demand the man is the skilled worker—one who not only understands the design and object of the completed machine, but who also understands perfectly the means to compass the design and secure the object. It is a wonder that so many apprentices are content to slide through their years of apprenticeship with only the ambition to serve their time and with no desire to perfect themselves in their work. There is now—there always is—room for first-class mechanics, workmen who not only run one machine, or handle one set of tools, but who can take a piece of work from inexperience and carry it forward to completion, working and directing in all the stages from the draughting board to the delivery to the purchaser.

In every large shop from whence heavy machinery and tools are sent out there are opportunities for "setting up" and starting, opportunities sought by most shop hands. But these chances are given to men who cannot be baulked by obstacles and difficulties which are sure to present themselves in situations where shop conveniences and handy appliances are lacking. One who understands the entire machine, who is capable of reproducing or finishing or fitting any part, who is a skilled worker and a good mechanic, these opportunities to prove his fitness are welcome and he is accorded privilege and given remuneration denied to those who are content with mere mechanical operation and the running of a machine. There are situations where hand skill with the use of only hand labor, guided by good mechanical judgment, can alone accomplish results, and the workman who is superior to convenient shop appliances shows himself to be a mechanic in the highest acceptance of the term.

These situations may occur in the shop as well as elsewhere, and there are frequent opportunities for the exercise of hand-skilled work in the best of shops. There is not a machine or tool used, however automatic, that was not originated by hand, and there is not one that does not occasionally require hand skill and his guidance for its management and direction. The lathe, planer, milling and shaping machine and other automatic or semi-automatic tools are restricted in their office, and they never escape entirely the control of the skilled hand, guided by the experienced judgment.—*En.*

**CHANGES IN THE RELATIVE ELEVATION OF LAND AND SEA.**—The impression that the northern coast of the American continent is slowly rising, and Prof. Shaler's estimate of the rate of emergence in progress as being over a foot, and perhaps as much as three ft. in a century, has been recently denied by Mr. Henry Schell, who states, in the Coast Survey Report for 1877, that the salt marshes are still, as they were in the time of the early explorers, at ordinary high-water level, and that the rocks on our coast, long notorious as dangerous to navigation, have not risen since they were first discovered. In his statements ancient maps and documents are cited, and the conditions of various rocks are considered in detail. He claims that no tilt in either direction has taken place in the Gulf of Maine. But eastward of latitude 64° 13', and especially in Newfoundland, great changes present themselves in the comparison of charts, the depths appearing at some points less and at other points greater now than formerly.

## New Minerals.

"A New American Gem" formed the subject of a short paper read at a late meeting of the New York Academy of Sciences. The new mineral which constitutes this gem was recently found in North Carolina, by Mr. William E. Widdien. It is of the emerald class, and will be known to the world as lithia-emerald, owing to the presence of lithia as one of its chemical constituents. These gems are described as very beautiful, having a pure green tint, with a liquid brilliancy that is quite distinctive and remarkable. They are selling at about the same price as the diamond. The mineral is found in a narrow chimney in a hard rock formation, geological character not given. The chimney is two feet one way by two and a-half inches the other, and descending at an angle of about seven degrees from the perpendicular.

Another new sideral mineral has also been found by Prof. J. Lawrence Smith while analyzing a meteorite which fell in Emmott county, Iowa, in May, 1879. He has named it Paekhamite, and describes it as essentially different from any mineral heretofore found associated with meteorites. It is a silicate of iron and magnesia, opalescent, of a light greenish-yellow color, of greasy aspect and cleaves scissily. Two or three specimens obtained projected from the outer surface of the stone, with a dingy yellow color and a fused exterior. The meteorite, surrounded by a large number of fragments, lay upon the wet prairie for nearly a year before being discovered, still bright, like a nugget of platinum, and with no appearance of rust.

Still another new mineral is reported, which has been named siderophyllite, in allusion to the large percentage of iron which it contains. In composition it is an iron-alumina mica, and was found near Pike's Peak, in Colorado.

**A NEW SELF-BLOWING FORGE.**—Mr. Eyre, of the firm of Heatfield, Eyre & Co., 158 Leadenhall street, London, England, has invented a self-blowing forge which is well illustrated in *Iron* of February 25th. The hearth and the hood of the forge are of the usual pattern, but underneath the hood is suspended a small steamer. At the top is a safety valve and steam gauge, while at the back of the hearth is a water gauge. A return pipe is brought from the boiler to the tuyre, the water in which becomes pretty well heated before again entering the boiler. At the back of the forge is a small vertical engine with a 2-inch cylinder and 4½-inch stroke, which by means of a grooved fly wheel and endless band, rotates the fan. When lighting the fire the bellows is worked for half an hour by hand, by means of a handle, and during this time sufficient steam will have been generated to drive the engine, which will then work automatically as long as required. The blast is regulated by means of a tap between the engine and boiler. The same engine can also be employed to turn a small lathe, and will really do about one horse-power. It is certainly an ingenious application of the utilization of waste heat.

**RE-ROLLING RAILS.**—But few people are aware of the immense amount of handling that is required to convert an old iron rail into a new one. We were recently a witness to a portion of the operation as performed at the Rolling mills at South San Francisco. From the time the rail arrives at the yard of the rolling mill until it is shipped out it is handled about thirty times. The process is as follows: It is first unloaded from the lighter, then picked up and run to the shears, then cut up, then piled into fagots, then loaded on, to barrow and charged into furnace, heated to a welding heat, then hauled out and placed on iron buggies, run to weighing rolls, where it is handled five or six times, until finished to a bloom, then returned to the buggy, carried to a repeating furnace, brought to a welding heat, then returned to the rolls on a buggy, passed through the rolls eight or nine times, then run to saws where both ends are cut off. It is then placed under the straightener, which takes out all minor crooks. The burr on the ends is then filed off, when the rail is inspected, then taken to the punching machine and fitted for splice bars, thence to the slotting machine, where it is slotted for the spikes; then the rail goes on the benches in the yards and from them to the cars.

**SOMETHING FOR INVENTORS TO EXPERIMENT WITH.**—It is not unusual for a steam fire engine to throw a stream of water from 200 to 300 ft. There is sufficient force employed to throw solid particles from the nozzle two or three times that distance, possibly more. An observer will notice, however, that a stream of water, shortly after leaving the nozzle, begins to spray. The problem is to keep the column of water solid. It has been suggested that the rotary motion of the water causes it to spread, and experiments show this to be the case, but the trouble is only partly avoided by placing flanges within and near the outlet of the nozzle. Is there not some other form of nozzle which will accomplish the result?

**THE TIDES OF ELECTRICITY.**—Mr. Alex. Adams, one of the officers of the British Post-office Telegraph Department, has discovered the existence of electric tides in telegraph circuits. By long continued and careful observation he has determined distinct variations of strength in those earth currents, which are invariably present on all telegraphic wires, following the different diurnal positions of the moon with respect to the earth.

## SCIENTIFIC PROGRESS.

## A Gigantic Artificial Moon.

The colossal representation of the moon, which has been on exhibition at Steinway hall, in this city, during the past week, does not appear to have attracted anything like the attention it deserves. On a half globe, 16 ft. in diameter, the mountains, plains and other characteristics of the lunar surface visible from the earth are shown in relief, with shadings and colorings faithfully representing the moon as seen through a powerful telescope. It is by far the largest, most elaborate and expensive portrait of the moon ever made; and, seeing that it was constructed for and under the immediate direction of one of the most eminent of living eelenographers, Dr. Schmidt, now director of the observatory at Athens, Greece, we may safely accept it as a faithful portrait. It certainly gives at a glance a clearer and more comprehensive idea of the physiography of the moon than could be got by much study with any other means short of a telescope of great power. When gradually lighted from one side by a powerful line light, the varying phases of the moon, from new to full, are shown with impressive vividness.

The shadows of the mountain ranges, the black depths of the crater pits, the changing light upon the broad plains, and other lunar phenomena pass rapidly before the eye, enabling one to obtain in a few hours, indeed in a few moments, a more comprehensive knowledge of the lunar surface than can ever be had of the earth's surface until some enthusiastic geographer constructs in relief a terrestrial globe on a scale of corresponding magnitude.

The "moon" has been purchased and brought to this country for exhibition by Mr. E. Riverston, and it is to be hoped that it will ultimately find a permanent abiding place in some of our public institutions. Meanwhile students of astronomy and all persons taking an interest in science will find the exhibition well worthy of attention.—*Scientific American.*

## Adhesion of Locomotive Wheels.

Since the introduction of steel rails and steel tires of driving wheels, there has been a considerable loss of adhesion. All locomotives are at times short of it. This occurs mostly in the starting of trains and in overcoming the resistance due to curves and high grades of the road. Engineers have been loath to increase the adhesion by loading the driving wheels with a permanent load, for the reason that the extra weight will, in case of high speed, crush and wear out the track of the road unduly.

A contrivance designed to meet these difficulties and effect at once the greatest degree of economy in this part of railway service has been invented quite recently, of which the inventor says: "It is estimated that there are at present about 16,000 locomotives in this country alone that are troubled by their lack of adhesion, and the study I indulged in was how to make these machines effective without injuring the track. 'The tender of the locomotive of the standard size weighs, when loaded, about 24 tons, and I undertook to transfer a part of this weight to the driving wheels of the locomotive at the will of the engineer and in exact proportion to the work the engine is doing, and this is perfectly accomplished. The engineer, without leaving his seat, can load his driving wheels at pleasure. The most important part of it is, that when the heavy work is done he at once discontinues its use and the engine is left light again for the speedy part of its work."

"My contrivance was put on engine No. 111, of the Boston and Albany road. It was a powerful engine, but short of adhesion, and, as engineer Hodge says, generally used a box of sand in making a trip. It now runs with a full load, in all states of the weather, without the use of sand. It has now been running about two months, and is apparently gaining in favor every day."

**A LUMINOUS LIQUID.**—It is well known that certain metallic salts, especially if previously heated, when exposed to direct sunlight, to the electric or the magnesium light, and then brought into a dark place, give off a yellow or a bluish-white light. Especially the sulphurates of magnesium, strontium, and calcium possess this property in a greater or less degree. Balmien has recently patented a mixture which possesses this property in a remarkable extent. Thus, if the dial plates of watches are coated with this composition and then with a colorless varnish, the figures may be seen in the dark at some distance, if they have been previously exposed to diffused daylight. According to my experiments the organic compounds of these metals possess the same property, especially rosin oil lime soaps. If 100 parts of rosin oil are hoiled in a suitable pan with 30 parts of freshly slaked lime, raising the heat by degrees, the mass which is at first lumpy becomes tougher, and finally passes into a thin liquid. As soon as this stage is reached, say at 320° Fah., the entire surface of the liquid becomes luminous in the dark, which is still more intense at a greater heat. At 350° Fah. the bluish-white light is very strong in the dark. Objects dipped in the liquid remain luminous for some time.—*B. Hoffman in Chemiker Zeitung.*

## The Telephotograph.

An apparatus has been devised by Mr. Shollford Bidwell which he calls the "telephotograph," and which, though still crude, makes an important step forward towards a solution of the problem of transmitting images by electricity. The instrument is described in the *Iron Age* as follows: The positive pole of a battery is connected, through a set of adjustable resistance coils, to a platinum stylus which rests its marking point on a plate of zinc, covered with a sheet of paper moistened with a solution of iodine of potassium. The circuit of the battery is completed through a galvanometer by a wire from the zinc plate to the negative pole of the battery. This is the receiving part of the apparatus. The transmitter consists of a second battery, the negative pole of which is connected to the platinum stylus through a sensitive eelenium cell, the circuit being completed also through the zinc plate and the galvanometer. Now, if the selenium cell be exposed to a strong light, or, in other words, if a beam of light be focused on it, and the variable resistance be so adjusted that the opposing currents in the two battery circuits exactly neutralize each other, no current will flow from the stylus to the plate across the iodized paper, and hence no stain of liberated iodine will mark the paper if the stylus be drawn across it. But if the light be shaded off the selenium, the resistance of the latter will increase, and the current from the first battery will, therefore, predominate, so as to cause a flow of electricity down the stylus. When the stylus is drawn across the paper it leaves its trace as a brown mark of liberated iodine; and this trace is strong or faint, according as the current is strong or feeble—that is to say, in proportion as the light is less or more intense. The galvanometer serves to indicate when the balance of currents is exact; and the connecting wires which correspond to the telegraph line between the two stations, where the transmitter and receiver are placed, may of course be of any length. With an apparatus having substantially these elements, Mr. Bidwell, before the physical society, succeeded in transmitting simple designs.

**ARE THEY NOT ARTISTS?**—A correspondent of the *German Town Telegraph*, after alluding to the grand paintings, superior sculptures, etc., results of the genius of our highest artists, asks:

"Are there not others, also, whom we may call artists? When," continues the writer, "I stand among a lot of common stone masons and see one man walk around among the stones, picking one out here and there, dressing one here and there, just as though he were playing, and then suddenly begin to set them up as fast as he can handle them and the mortar, making a handsome wall, I call him an artist. If we look at a man hewing a leg straight and smooth, alike in thickness the whole length, and not leaving a mark of the juggling axe, he too seems to me to be entitled to the above name. Or a man, who cannot even write his name, bracing himself aside of a huge tree, and sending his axe into it with the precision of a rifle shot, making every stroke tell, and never missing the mark, and when cut in one side changes hands on the axe and cut the other, and throw the tree just where he wishes it to fall—he, too, is not devoid of artistic skill. And many a common blacksmith, who will forge out a piece of iron or steel as round as if it had passed through the turner's hands, or as square as if ran through the planing machine—I count him among the artists. Yet none of these men are ever classed with those of the higher arts."

**DANGER OF LIGHTNING FROM TELEPHONE CONNECTIONS.**—The Cantonal government of Zurich, having been applied to by a telephone company for permission to fix the supports of insulators on the tops of certain public buildings, applied to Prof. Kleiner for an opinion. The following is a summary of the chief points in his report: 1. The danger of lightning in houses over which telephone wires are stretched is not increased, but lessened, if the total conductivity of a wire is approximately equal to that of a lightning conductor. This condition is not always fulfilled under existing arrangements. It may be insured by very simple arrangements, such as the introduction of a special wire for the conduction of lightning wherever the number of wires of two millimeters in thickness running in the same direction is less than 60. This should be insisted upon in all cases. Single connections running along the houses should be stronger than at present—at least as strong as telegraph wires.

2. As the properties of a telephonic plexus for attracting and conducting lightning extend over far wider tracts than those of a lightning rod, a strict regulation of their make and condition is necessary.

The use of telephones should be suspended during thunderstorms.—*Neue Zurich Zeitung.*

**PULVERIZED COAL.**—The *Iron Age* says that Messrs. Alexander & Sons, of New York, are making some very successful experiments at the Washington Iron Works with pulverized coal. The coal is blown into a furnace and burns freely with a strong heat, but the apparatus is being altered to secure still better results, after which the process will be practically tested on one of the Havana steamers. The coal is fed from a perpendicular funnel, and the air enters horizontally from the side.



Table of Highest and Lowest Sales in  
S. F. Stock Exchange.

Name of Company.	Week Ending Mar. 31	Week Ending Apr. 7	Week Ending Apr. 14	Week Ending Apr. 21
Alpha.....	2.90	2.31	3.40	3.51
Alta.....	2.10	2.35	1.30	2.35
Andes.....	1.10	1.10	1.30	2.05
Alhambra.....	2.15	1.20	2.20	1.90
Argenta.....	1.50	1.00	4.00	3.50
Ardena.....	2.00	2.00	2.00	1.50
Belcher.....	1.85	1.30	1.85	2.10
Belmont.....	3.00	3.00	4.00	2.35
Best & Belcher.....	91	71	101	111
Bullion.....	1.35	3.00	1.35	1.45
Bechtel.....	650	550	550	1.750
Belle Isle.....	500	450	450	450
Bodie.....	50	50	50	50
Benton.....	600	500	600	750
Bulwer.....	1.90	2.00	2.10	2.40
Boston.....	2.00	1.50	1.50	1.60
Black Hawk.....	300	200	250	350
Belvidere.....	1.00	1.00	1.00	1.00
Booker.....	1.00	1.00	1.00	1.00
Caledonia.....	1.00	1.00	1.00	1.00
California.....	1.30	1.30	1.40	1.40
Challenge.....	650	850	700	1.100
Chollar.....	2.10	2.10	2.10	2.10
Confidence.....	3.30	2.60	3.40	3.60
Con Imperial.....	1.50	1.50	1.50	1.50
Con Virginia.....	1.35	1.10	1.45	1.35
Crown Point.....	1.35	1.10	1.45	1.35
Columbia.....	600	600	600	600
Champion.....	1.00	1.00	1.00	1.00
Concordia.....	1.00	1.00	1.00	1.00
Concordia (Va.).....	500	500	500	500
Con Pacific.....	900	900	900	900
Derbec.....	500	450	400	550
Day.....	1.50	1.50	1.50	1.50
E. M. Diablo.....	1.50	1.50	1.50	1.50
Eureka Co.....	2.00	2.00	2.00	2.00
Eschscholtz.....	1.15	800	1.05	1.15
Endowment.....	600	550	550	550
Grand Prize.....	600	550	550	550
Golden Gate.....	800	750	750	750
Goodshaw.....	4.80	3.30	4.10	3.80
Gould & Curry.....	3.30	3.15	3.65	4.10
Hale & Norcross.....	3.30	3.15	3.65	4.10
Hussey.....	3.30	3.15	3.65	4.10
Head Center.....	3.30	3.15	3.65	4.10
Independence.....	2.50	1.50	2.50	3.00
Juba.....	550	400	650	700
Justice.....	550	400	650	700
Jupiter.....	1.00	1.00	1.00	1.00
Kentuck.....	1.00	1.00	1.00	1.00
Kosuth.....	1.00	1.00	1.00	1.00
Lady Bryan.....	1.00	1.00	1.00	1.00
Lady Wash.....	1.00	1.00	1.00	1.00
Leviathan.....	1.00	1.00	1.00	1.00
Leeds.....	1.00	1.00	1.00	1.00
May Belle.....	1.00	1.00	1.00	1.00
Modoc.....	1.00	1.00	1.00	1.00
Manhattan.....	1.00	1.00	1.00	1.00
Martin White.....	1.00	1.00	1.00	1.00
McClinton.....	1.00	1.00	1.00	1.00
Mono.....	1.00	1.00	1.00	1.00
Mexican.....	5.00	4.00	5.00	5.00
Mr. Diablo.....	5.00	4.00	5.00	5.00
Morning Star.....	2.00	1.50	2.00	2.00
Mr. Potosi.....	2.00	1.50	2.00	2.00
Nonday.....	1.30	1.70	1.30	1.70
New York.....	1.30	1.70	1.30	1.70
Northern Belle.....	1.30	1.70	1.30	1.70
North Noonday.....	1.30	1.70	1.30	1.70
Norway.....	2.15	1.15	1.15	1.15
Occidental.....	1.95	1.10	1.10	1.10
Opfir.....	1.35	4.10	3.85	4.30
Original Keystone.....	800	650	1.35	1.40
Overman.....	800	750	900	750
Oro.....	800	750	900	750
Pacific.....	600	550	550	550
Potosi.....	2.45	1.25	2.35	2.40
Queen Bee.....	50	50	50	50
South Bulwer.....	2.05	1.70	2.20	2.40
Savage.....	60	60	60	60
Seg Belcher.....	300	250	350	400
Serra Nevada.....	300	250	350	400
Silver Hill.....	24	22	24	23
Silver King.....	24	22	24	23
Succor.....	24	22	24	23
Summit.....	1.10	1.30	1.10	1.30
Scorpion.....	1.10	1.30	1.10	1.30
Solid Silver.....	1.10	1.30	1.10	1.30
South Bodie.....	1.10	1.30	1.10	1.30
Standard.....	1.10	1.30	1.10	1.30
Syndicate.....	1.10	1.30	1.10	1.30
Tioga Co.....	400	350	400	450
Tip-top.....	400	350	400	450
Tuscarora.....	1.00	1.00	1.00	1.00
Union Co.....	1.00	1.00	1.00	1.00
Utah.....	1.00	1.00	1.00	1.00
Ward.....	1.00	1.00	1.00	1.00
Wales.....	950	900	1.10	1.20
Yellow Jacket.....	3.40	2.70	3.15	3.65

## Sales at S. F. Stock Exchange.

Thursday A.M., Apr. 21.	110 Union.....	101 at 100
350 Alta.....	350	110 at 100
45 Alpha.....	350	Yellow Jacket.....
645 Andes.....	2.30	3.50
335 B & Belcher.....	1.10	2.10
1350 Bullion.....	1.65	1.60
820 Belcher.....	2.35	2.45
1250 Benton.....	2.35	2.45
1210 Chollar.....	3.30	3.35
835 Con Virginia.....	2.55	500
335 California.....	1.10	1.05
1145 Crown Point.....	2.30	2.25
400 Confidence.....	500	500
250 Concordia (Va.).....	300	200
250 Capital.....	950	500
1500 Con Imperial.....	2.50	2.50
1025 Caledonia.....	3.50	3.50
305 Eschscholtz.....	1.10	1.10
150 Golden Gate.....	2.20	375
800 Gould & Curry.....	7.00	100
330 Hale & Norcross.....	3.50	3.50
325 Justice.....	4.50	500
1100 Juba.....	4.50	500
50 Kentuck.....	1.10	200
305 Lady Wash.....	2.00	2.00
305 Mexican.....	2.45	1.00
630 New York.....	3.00	2.00
300 Ohir.....	8.00	1.70
825 Overman.....	2.20	1.00
600 Occidental.....	1.35	1.35
670 Potosi.....	1.05	1.05
1145 Savage.....	3.55	3.55
950 Silver Hill.....	3.00	3.00
905 Sierra Nevada.....	1.20	1.20
200 Solid Silver.....	2.10	2.10
	250 University.....	50

**MASTODON BONES.**—There were mastodon bones found recently in the La Grange gravel claim, by Joseph Jernigan, recently drowned in the Tuolumne river. At the time of the discovery the miners were washing with hydraulic pipe many ft. below the surface. The bones of this immense animal were lying down at full length. As soon as the air struck them, some of the finer bones decomposed; but at the present writing a number of the teeth and a tusk are in a good state of preservation. From the skeleton found, this animal must have been immense—one bone in particular is about 4 1/2 ft., while in the ordinary ox the corresponding bone is only about eight inches; the tusk is about 16 ft. long; one of the molars is about six inches across and the back grinder eight inches in length and four across.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals.

## ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Nevada	20	50	Mar 5	Apr 12	W H Watson	302 Montgomery st
Andes S M Co	Nevada	16	25	Mar 1	Apr 7	B Burris	309 Montgomery st
Best & Belcher M Co	Nevada	20	50	Mar 17	Apr 20	W Willis	309 Montgomery st
Belcher S M Co	Nevada	27	75	Apr 12	May 7	Jno Crockett	327 Pine st
Bellmont S M Co	Nevada	23	100	Mar 3	Apr 3	J W Pew	310 Pine st
Bullion M Co	Nevada	18	100	Feb 28	Apr 5	J M Brazell	328 Montgomery st
Caledonia S M Co	California	34	25	Mar 5	Apr 9	R Wegener	414 California st
Crown Point G & S M Co	Nevada	45	50	Mar 23	Apr 23	Jas Newlands	327 Pine st
Day Silver M Co	Nevada	9	25	Apr 16	May 3	J W Pew	310 Pine st
Hale & Norcross M Co	Nevada	68	50	Mar 14	Apr 14	J F Lightner	309 Montgomery st
Justice M Co	Nevada	34	25	Mar 26	Apr 26	R E Kelley	413 California st
Leviathan M Co	Nevada	12	25	Mar 23	Apr 23	F A Frisley	330 Pine st
Mono G M Co	California	11	50	Mar 17	Apr 22	W H Lent	309 Montgomery st
Norcross M Co	Nevada	15	50	Mar 16	Apr 21	C L McCoy	309 Montgomery st
Northern Light M Co	California	7	15	Mar 1	Apr 6	F S Monroe	310 Pine st
Overman M Co	Nevada	49	50	Mar 17	Apr 21	G D Edwards	414 California st
Occidental Con G M Co	California	6	04	Feb 21	Apr 21	W T Smith	402 Montgomery st
Opfir M Co	Nevada	39	100	Mar 3	Apr 4	C L McCoy	309 Montgomery st
Phil Sheridan M Co	Nevada	11	10	Apr 9	May 5	D Wilder	324 California st
Peck M Co	Arizona	3	100	Apr 14	May 23	Chas T Bridge	324 California st
Savage M Co	Nevada	46	50	Apr 4	May 6	E B Holmes	309 Montgomery st
University G M Co	California	6	10	Apr 6	May 12	Win Letts Oliver	328 Montgomery st

## OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Amelia G M Co	California	1	10	Mar 14	Apr 22	J B Leighton	527 Clay st
Black Hawk G M Co	California	11	10	Mar 14	Apr 22	H A Charles	409 California st
Brooklyn Con M Co	California	1	10	Feb 21	Apr 22	J T McGehegan	318 Pine st
Con Imp M Co	Nevada	15	10	Apr 18	May 4	W E Deen	309 Montgomery st
Delano G & S M Co	California	1	05	Mar 23	Apr 26	J Morizo	328 Montgomery st
Golden Fleece G M Co	California	20	30	Mar 2	Apr 3	R R Schirmel	785 Folsom st
Golden Gate G M Co	California	4	50	Mar 26	May 3	J T McGehegan	318 Pine st
Grand Prize M Co	California	40	24	Mar 24	Apr 29	E M Hall	327 Pine st
Excelsior G M Co	California	15	25	Mar 9	Apr 6	D B Chisholm	327 Pine st
Eintracht G M Co	California	6	05	Mar 12	Apr 18	H Kunz	209 Sansome st
Florida Hill M Co	Idaho	3	30	Mar 17	Apr 25	R Wegener	414 California st
Independence M Co	Nevada	7	25	Mar 5	Apr 9	E M Hall	327 Pine st
Ivanpah M Co	California	3	10	Mar 5	Apr 9	E J Friedlander	309 California st
Jupiter M Co	California	12	25	Mar 19	Apr 22	E C Masten	309 Montgomery st
Lady Washington Con M Co	Nevada	2	10	Apr 15	May 20	W H Watson	302 Montgomery st
Liquira G & S M Co	Nevada	1	25	Apr 2	May 5	A B Cooper	325 Montgomery st
Rocky Point G M Co	California	1	40	Mar 24	Apr 29	E N N Brunt	318 Pine st
Matamoras M Co	California	8	25	Apr 13	May 7	A W Rose Jr	302 Montgomery st
May Flower G M Co	California	11	10	Apr 12	May 13	J Morizo	328 Montgomery st
Maryland Con G M Co	California	2	25	Apr 10	May 9	E D Farnsworth	219 Sansome st
Maybell Con M Co	California	7	10	Mar 19	Apr 14	W Taylor	310 Pine st
Monocuma Tunnel M Co	California	4	25	Mar 19	Apr 22	F E Lutz	330 Pine st
Mono M Co	California	11	50	Mar 17	Apr 22	W R Lent	309 Montgomery st
McElroy Gravel M Co	California	5	10	Mar 8	Apr 13	L Little	607 Washington st
McMillan S M Co	Arizona	3	25	Jan 12	Apr 29	J Morizo	328 Montgomery st
Martin White M Co	Nevada	25	Mar 19	Apr 23	May 24	J S Wallace	309 Montgomery st
Mr Potosi Con M Co	Nevada	6	25	Apr 6	May 13	E A Holmes	318 Pine st
Original Keystone M Co	Nevada	4	25	Mar 19	Apr 22	F E Lutz	330 Pine st
Paradise Valley M Co	Nevada	2	07	Apr 13	May 13	Wm Letts Oliver	328 Montgomery st
Real Del Monte M Co	Nevada	14	25	Jan 31	Mar 5	C V Hubbard	310 Pine st
Rocky Point M Co	California	7	5	Mar 19	Apr 16	W R Hughes	330 Pine st
Real Del Monte M Co	California	15	50	Mar 28	May 2	C Van Hubbard	310 Pine st
Swamp Angel G M Co	California	3	05	Apr 19	May 20	Lewis Little	607 Washington st
Swansea M Co	California	2	03	Apr 5	May 14	M A Wheeler	320 Sansome st
Santa Cruz Co	Cal	10	09	Mar 19	Apr 25	W Hughes	309 Montgomery st
San Pedro M Co	Arizona	1	05	Mar 6	May 2	Henry Dease	310 Pine st
Tuscarora M & M Co	Nevada	8	15	Apr 2	May 9	M E Spelling	309 California st
Trojan M Co	Nevada	13	10	Mar 7	Apr 11	David Wilder	328 Montgomery st
Tilden M Co	Nevada	1	10	Mar 12	Apr 16	J C Masten	309 Montgomery st
Union Con M Co	Nevada	10	100	Mar 7	Apr 11	P M Buntington	309 California st

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Indian Queen M Co	Nevada	Grove Adams	Merchants' Ex	Annual	Apr 26
Buckeye H & W M Co	Montana	W H Lowden	320 Sansome st	Annual	May 2
Con Imp M Co	Nevada	E E Dean	309 Montgomery st	Annual	May 4
Justice M Co	Nevada	R E Kelley	413 California st	Annual	May 2
Morning Star M Co	Nevada	J B Maholin	318 Pine st	Annual	Apr 23
North Gould & Curry M Co	Nevada	Wm H Ennis	331 Montgomery st	Annual	Apr 23
Onida M Co	Nevada	H P Bush	Merchants' Ex	Annual	May 2
Silver King South M Co	Arizona	A Judson	320 Sansome st	Annual	May 2
Woodville Con M Co	California	R E Kelley	413 California st	Annual	May 2

## LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50	Mar 21
Father Do Smet M Co	Dakota	H Dean	New York	50	Mar 1
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	50	Mar 15
Silver King M Co	Arizona	J Nash	315 California st	25	Mar 15
Standard Con M Co (2)	California	Wm Willis	309 Montgomery st	75	Apr 12
Western M Co	California	C S Curtiss	309 Montgomery st	75	Mar 2
Nevado M Co	Nevada	E M Hall	327 Pine st	25	Mar 25



camp. Much of the melting in the mountains, making every thing slushy. With such mines as the Bully Boy and Webster, the Fillmore, the Great Western, the Copper Belt and five other prospects undeveloped, in Ohio mining districts, then the Deer Trail, the Pluto, the Chrystal, Clyde, Homestate, with a great many more equally as good, but undeveloped, in Montana, and the great variety of the Deer Trail mine. Add to these the rich prospects on Ten Mile—such claims as the Rothschild, the Uncle Sam, the Mailfork and the Bully Boy—all within a radius of 10 miles, I think we have good and sufficient grounds to build hopes of a great mining center. With no excitement, we may have to wait some time for the camp to place itself before the mining towns. The best place to go to, if you do not own a good mine, is in the Green-Eyed Monster the owners have lived in sinking, drifting, crosscutting and tunneling. They have opened out a body of ore that shows, by actual measurement, 120,000 tons of fine milling ore, the average assay of which is \$25 per ton. The ore in this mine does contain scarcely a particle of refractory material. It is the best west, and about the best in the country, is a rich claim called the Pluto, owned by Johnny Campbell and Mr. Morton. This mine is the richest little vein in this country. The Occidental M. & Co. have commenced work and have already struck shipping ore, with plenty of 40 rock that would work here. The ore is free milling.



## Priority in Mining Surveys.

The Secretary of the Interior has recently established the following rule in regard to the survey of mining claims, viz: "The mining survey first applied for shall have priority of action in all its stages in the office of the Surveyor General, including the delivery thereof, over any other survey of the same ground or any portion thereof;" and authorized this office to prescribe regulations for the proper enforcement thereof.

Commissioner Williamson, of the General Land Office, has, in accordance with this ruling, issued instructions to Surveyors General as follows:

In the future, therefore, you will be governed by these regulations:

1. The Surveyor General should not order or authorize a survey of a claim which conflicts with one previously applied for until the survey first applied for has been completed, examined, approved and platted, and the plats delivered.

2. When the conflict does not appear until the field-notes of the respective surveys are returned, then the survey first applied for should be first examined, approved and platted, and the plats delivered before the field-notes of the survey last applied for are taken up for examination or plats constructed.

3. When the survey first authorized is not returned within a reasonable period, and the applicant for a conflicting survey makes affidavit that he believes (stating the reasons for his belief) that such first applicant has abandoned his purpose of having a survey made, or is deferring it for vexatious purposes, to-wit, to postpone the subsequent applicant, the Surveyor General shall give notice of such charges to such first applicant, and call upon him for an explanation under oath of the delay. He shall also require the Deputy Mineral Surveyor to make a full statement in writing, explanatory of the delay; and if the Surveyor General shall conclude that good and sufficient reasons for such delay do not exist, he shall authorize the applicant for the conflicting survey to proceed with the same; otherwise, the order of proceeding shall not be changed. The Surveyor General shall retain on his files all affidavits, etc., relating to the controversy, and in event of an appeal from his action shall forward the same to this office.

The Deputy Surveyors are under your control in the execution of their work, and you will properly instruct them concerning the prompt execution thereof.

4. Whenever an applicant for a survey shall have reason to suppose that a conflicting claimant will also apply for a survey for patent, he may give notice in writing to the Surveyor General, particularly describing such conflicting claim, and file a copy of the notice of location of such conflicting claim. In such case the Surveyor General will not order or authorize any survey of such conflicting claim until the survey first applied for has been examined, completed, approved, and platted, and the plats delivered.

It is the intent of the rules adopted as aforesaid to furnish the first applicant in good faith for a survey with the opportunity to first present his application for patent at the district land office, and thus secure orderly proceedings. When the field notes and plats have been delivered, however, it is held by the honorable Secretary that no authority exists to prescribe the order in which application for patent shall be filed, it being then the right of the party to present his application when he chooses.

Therefore you will seek to avoid errors in the matter of delivery of surveys, and in case of conflicting surveys will postpone the delivery of those last applied for for such temporary period as will be sufficient to enable the first applicant to present his application for patent.

When the survey first applied for is executed and delivered in ignorance of a conflict which speedily thereafter shall appear by the return of a subsequent survey, you will notify the prior party of the existence of a conflict. If, however, the first survey shall have been delivered for any considerable period, at the time the conflict is shown such notice need not be given.

**SALE IN ARIZONA.**—The Mammoth mine, which was located and formerly owned by J. H. Williams, has been recently sold to Eastern parties through the instrumentality of their representative, William E. Graves, for the sum of \$35,000. This property is situated on the west side of the Santa Rita mountains, and is within the boundaries of the Helvetia district. As no work has as yet been done, the mine was sold simply on its surface showings. The crops are simply enormous, being in places over 130 ft in height, and 210 ft in width. Mr. Graves states that there are at least \$2,000,000 worth of copper in sight, calculating from the assay returns made at various places along the vein, which prove that it will run easily 20% copper.

**Tybo.**—The following is an extract from a letter from Tybo district, to the Eureka Sentinel: The prediction I made in one of my letters a month past, when the Tybo Con. Mining Co. closed down, that the property would not remain idle over a month, has proved true, for to-day's mail gladdened the faces of many of our business men and our grass widows whose husbands have left them in search of work. These widows were told to send for their husbands and have them ready to go to work on the 1st of April.

## Petroleum and Plant Life.

At the last meeting of the California Academy of Sciences, a discussion took place on the subject of the use of petroleum for destroying scale insects on rose bushes. Dr. Henry Gibbons said that two months ago he put petroleum on the trees in his garden. Since then the trees have grown better than ever before; they have grown faster than ever before, and given better roses than ever before. The petroleum seems to kill the scale insect. The handsomest rose he exhibited was from a bush which looked nearly dead a short time since. The petroleum was mixed with castor oil. It is not applied profusely and allowed to run down the roots. Perhaps in a crude state the petroleum would be bad, even on the stalks; but mixed with the castor oil it appears to be advantageous to the plant. The compound does not evaporate nor give out the insoluble portion. Therefore you have a permanent coating, acting on the entire surface of the plant.

Dr. Gibbons exhibited a large bunch of beautiful roses of exceeding fragrance, and in full bloom, which he gathered from a bush in his garden which two months ago was overrun with scale bugs and nearly dead.

Now, since using the petroleum and the castor oil, no sign of any scale insect can be seen in the whole garden. He thought castor oil was the only oil that will mix with alcohol, turpentine and the benzines. It is soluble in alcohol, and when mixed with crude petroleum forms a sort of varnish or cement, which remains on the bushes, and does not fall to the ground. Petroleum, uncombined with castor oil, evaporates swiftly, but when combined forms a useful coating to preserve the plant. Many things have been thus tried. Trees have been whitewashed with caustic potash and lime. One of his rose bushes, nearly ruined by scale insects, thus treated, has borne an unusual number of roses, and a single cactus has borne 200 flowers this season. He thought these were practical facts, and quite as valuable as theoretical ones, although he valued both, and was glad to learn of any experience having a bearing of such importance to the agricultural industries of the human family. He cautioned persons against saturating the earth with petroleum as such a course prevents future vegetation. Like all things else, its moderate use, wisely directed, is good, and its excessive use is destructive. A grain of opium relieves pain, but its habitual use persisted in, brings death.

Dr. Behr said that as the mixture was not soluble in water, if it reaches the earth, it cakes the ground and thus shuts out the air, which must permeate the surface and is necessary to plant growth. A few applications will make rose-bushes grow better if sparingly applied, and kill the scale-bugs, but if allowed to reach the soil, it renders vegetation thereafter impossible in that spot, until it is eradicated.

Dr. A. Kellogg thought a simple wash of common lye would at first be sufficient in many cases. Petroleum deteriorates ground for crops. One scale-bug has 60 offspring.

Mr. Verder received a large lot of lemon trees from Australia, covered with scale bugs. He applied refined petroleum to the leaves carefully, and they all fell off, but every bud died, and fresh leaves came out, and the plants continued healthy for many years. He afterward applied it successfully to orange trees. He thinks there is a misapprehension among those who condemn its use. It should not be allowed to reach the ground.

**LONGITUDE OF THE ASIATIC COAST OF THE PACIFIC.**—It is understood that Lieutenant Commanders F. M. Green and C. H. Davis, Lieutenants S. M. Ackley and John Morris, and Surgeon Dale, U. S. N., now in San Francisco, have been detailed by the Navy Department to determine the correct longitude of the Asiatic coast of the Pacific ocean. They sail Saturday for China, to join the *Palos* on the Asiatic station. All points on the coast of Japan and China, connected by cable, will be visited, and their exact longitude determined. The American officers have permission from the cable companies to establish stations and use the wires at night. English officers are engaged in a similar work in New Zealand and Australia. The information obtained from the observations will be exchanged by the two nations. English officers have determined the longitude as far as Madras and Russian officers have made observations on the Siberian coast. All observations have been taken from the Hongkong observatory. The American party will ascertain the precise longitude of that place, there being a question as to the accuracy of the standard. The object of this movement by the Navy Department is to establish correct standards, from which true charts for the protection of maritime interests may be produced.

**IMITATION INLAYING.**—Suppose an oak panel with a design inlaid with walnut is wanted. Grain the panel wholly in oil. This is not a bad ground for walnut. When the oak is dry, grain the whole of the panel in distemper. Have a paper with the design drawn thereon, the back of which has been rubbed with whitening, place it on the panel, and with a painted stick trace the design. Then with a brush and quick varnish trace the whole of the design. When the varnish is dry, with a sponge and water remove the distemper where the varnish has not touched. This, if well executed, presents a most beautiful imitation of inlaid wood. Marbles are executed in a similar manner.

## South American Mines.

*The Miner*, published at Barbacoas, in the Republic of the United States of Colombia, South America, shows up the advantages of that country as a mining section. The mines in that section, called the Barbacoas mines, have been worked for hundreds of years by the old and slow process only known to the inhabitants of that country, and consequently not one-tenth of the ground rich with gold has been worked over.

Notwithstanding the long time the mines have been worked not a tithe of the ground producing gold has been worked over. As a general thing that part of the mine where water could be most easily obtained and which could be worked at the least expense to the owners has been worked. Immense tracts yet remain untouched on most of the mines, especially so between the rivers Telemhi and Magni. Besides, the streams forming the head waters of these and other rivers are almost unknown to the miner, and are not even prospected except very superficially, but gold is known to exist in all of them. If these unworked grounds of the old mines, and the idle government lands of the head waters of the rivers were only in the hands of energetic and experienced California miners, with the improvements in the ways of working which they would bring with them, the world would be surprised at the result. California in its palmist days would be repeated. The great need of the country to produce this result is an emigration of miners of experience, with improved machinery, such as California produces and Californians know how to use—men of small capital and energy, not afraid of making improvements in the cutting of ditches, building of reservoirs or other means according to the wants of each locality, in bringing on water to the mines, or in draining grounds known to be rich in gold.

With the object in view of letting the world know of the richness in mines, as to give information of new arrangements made here for the reception of emigrants, an association has been formed in this place, of the best and most active part of the inhabitants, together with mine owners, who bind themselves to give better advantages than heretofore to miners coming here to open up the immense resources of this most neglected part of the world.

## Nevada City District.

While the newspapers of the country are teeming with exaggerated reports of the mineral discoveries being made in other sections of the country, this district is pursuing the even tenor of its healthful way and rapidly proving itself to be among the best fields in the world for legitimate mining operations. The quarter of a century's experience in quartz mining here has taught our claim owners many a valuable lesson about the industry, including every detail from the time the grass roots are cut till hars of gold are ready for shipment. There is no teacher like experience; and the experience that will enable a man to conduct a mine successfully in one section is often found valueless when he applies its principles in another locality. It is only within the last two or three years that the miners of Nevada county have begun to approach a thorough understanding of their business. The saying of this is no disrespect to earlier workers, for it was due to their intelligent efforts and valuable discoveries made from time to time that the industry is now so nearly reaching perfection. It has been said "there is nothing new under the sun," but the utterance was made before men began to search in the bowels of the earth of the State of California for metallic treasures. There has been a remarkable reformation in our midst, and it must be remembered that our miners are not imitators, but originators of ideas. They have studied out more certain and economical ways to find gold-bearing ledges than they were wont to pursue until now; they have disproven the once universally accepted theory that their mines would not pay beyond a certain depth, and found that the most valuable deposits often lie a thousand ft. or more below the starting point; they are learning simple and economic methods by which to master the most rebellious and low-grade ores when necessary, besides many other things. They are not too indolent to think, or too cautious to experiment to a reasonable extent. They are building up what we sincerely believe will within the next three or four years be the leading gold mining center of America. During no three past years combined has so much advancement been made in the way of adding hoisting and milling facilities as is the case this season. —*Nevada Transcript*.

**UNITED STATES AID TO AGRICULTURE.**—According to the latest advices from Washington, the total amount appropriated for the Agricultural Department is \$330,050. Among the special items is an addition of \$500 to the salary of the Commissioner (a restoration to \$3,500); examination of and report on wool, \$5,000; for investigation of animal diseases, \$25,000; experiments on tea, \$5,000; insect investigations, \$10,000; for continuance of experiments in sorghum sugar, \$17,000; beet sugar, \$10,000; for a building on the department grounds for the display of agricultural implements, \$10,000.

The whole distance from New York to San Francisco by the new southern route is more than 300 miles longer than by the northern route, but the southern route has better grades.

## Marine Glues.

At a recent meeting of the Polytechnic Club of the American Institute a paper was read on "Glass and Cements," by Dr. John Phin. In the course of his remarks he had the following to say about marine glues.

Waterproof glues are made in two ways. Glue and linseed oil are recommended, but have had better success with the mixture. The chromates may be used with glue. These, when exposed to the light, render the compound insoluble.

Aquarium cement is the best waterproof cement I know. The formula is: Litharge, 3; white sand, 3; plaster of Paris, 3; rosin, 1; hoiled linseed oil, —.

The solids are to be taken by measure in powder and mixed. As it sets rapidly, the same must not be added until it is wanted for use. It is better for being put into a mortar and pounded. It hardens in three days. It will hold glass firmly, and with it glass tanks may be made without frames, if the angles are well filled with cement. It is a kind of mastic, and could be used on brick.

What is technically known as marine glue stands almost by itself. Where it can be put on hot it is admirable. It is composed of India rubber and shellac, dissolved in naphtha. Some kinds are hard, some almost liquid. I have seen this glue adhere to glass so firmly as to tear the glass when plates were separated.

In the discussion which followed, Dr. Parmalee gave some interesting experiences in the manufacture of marine glue. He said its melting point was about 230 degrees, and in making it was injured if the heat was carried above this point. In applying it care should be taken not to go above this heat, as the melting point would be raised and the strength diminished. In applying it the soldering iron may be used, but its heat must be regulated.

In answer to Dr. Parmalee, Dr. Phin said that Jeffries, the inventor, put three kinds of marine glue in the market; that the kind he himself had used was that known as "D. H. K.," and he had no difficulty in making it adhere to glass—a point which caused some surprise.

## Chair of Entomology at the University.

The Board of Regents of the State University have promptly granted the request of the fruit growers as expressed by their several societies, and have created a chair of entomology, provided the State will increase the appropriations to the University sufficiently to cover the cost of the new professor. This we trust will be done speedily, for the successful working of the anti-insect acts demands the services of a good economic entomologist who is abreast of the progress made in the anti-insect warfare during the last few years.

At a meeting of the Regents held April 12th, the following report of Committee on Instruction and Visitation was received and adopted:

The committee of instruction and visitation have had under consideration the petitions of the several societies and citizens asking for the creation of a Chair of Entomology, and would respectfully report that they have carefully considered the subject and would recommend:

First.—That a Chair of Entomology, adjunct to the Chair of Natural History, be created.

Second.—This recommendation is based and conditioned upon the premises that the legislature will annually appropriate not less than \$2,000 for this especial purpose.

**IMPORTANT TUNNEL ENTERPRISE.**—The *Placer Herald* says: Auburn is now growing, and is now prosperous, and a new project is on foot with every assurance of success, which is calculated to add to that growth and that prosperity. We refer to the proposed cross tunnel in Duncan hill. In this hill there are from a dozen to 15 quartz ledges that rib the hill from east to west, and every one of them, so far as is protected, are rich above the average. The cross tunnel running from the south side will cut these ledges at a depth of from 800 to 900 ft. on the incline, affording drainage to all and a very convenient means of working them. With this tunnel completed, even though the royalty for using the tunnel should amount to \$2 or \$3 per ton, the inducement for the different claim owners to go to work taking out ore would be irresistible. They have already commenced work. The place for the opening of the tunnel is being faced.

**A NEW PRODUCT FROM BIRCH BARK.**—A French inventor has patented a method of improving india-rubber and gutta percha by the addition of a distillate of birch bark. By distilling the outer layers of the bark he obtains a dense black gummy matter which possesses the properties of ordinary gutta percha with the additional quality of resisting both the action of air and the strongest corrosive acids. He claims also that by adding a small portion of the birch bark gum to gutta percha or india-rubber (one-twentieth part will suffice), the durability of the rubber or the gutta percha will be greatly increased, the new mixture not being acted upon by the air or by acids.

**COOLING HOT JOURNALS.**—A simple method of cooling shaft journals consist in placing an endless belt of a loose water-absorbing texture on the shaft as near the heated part as may be and allowing the lower light to run in cold water, which may be held in a vessel at a convenient distance below the shaft. Continuous contact of the liquid band carries away the heat of friction as it is produced, without spilling or splashing of water on and about the machinery, and without contact of the lubricant in the journal boxes.



## General Mining Notes.

MANY prospectors are leaving the Comstock for the Wood River country.

SILVER bars to the value of \$800 were shipped from the Owen's Lake mine, Inyo, the other day.

THE bullion yield of Tombstone and Harshaw districts, Arizona, for the first quarter of 1881 was \$992,337 16.

FROM January 1st to March 20th the Ontario mine produced \$502,593. The shaft is now down to the 800 ft. level.

THE Grand Central M. Co.'s mill of Tombstone is crushing 90 tons ore daily. It has 30 stamps, and is pronounced to be very complete.

THE new gold mine, situated opposite Bishop creek, in the foothills of the Inyo range, has been sold by Hypolite Calcon and partners to Bodie parties for the sum of \$15,000 cash.

THE result of the semi-monthly clean-up at the Homestake mine for March 15th was four gold bricks, one of which weighed 2,500 oz., the largest ever made at that point, valued at \$45,000.

DURING the year 1880, 16 new stamp-mills were erected in Dakota. The present year the Homestake intend adding 400 stamps. At present there are nearly 1,700 stamps in the Black Hills.

A STRIKE of sufficient importance has been made in the San Jose mine, at Pagan canyon, to justify starting the old Steptoe and Social mill again, which, we learn, will be done without delay.

OLD Comstock brokers have opened offices in Tombstone, Arizona, in order that the people of that district may have the opportunity of dealing in Comstock shares. This seems rather strange.

IN Cherry Creek district, Nevada, are over 200 miners, and there are excellent indications of permanency in the mines. There is a regular porphyry belt four or five miles long, lying on slate and lime.

IN Flowery district several mills are running on old croppings of the Lady Bryan, Monte Christo and several other veins, the plan of deep shafts and extensive hoisting works having been abandoned for the present.

THE Tombstone M. and M. Co. of Arizona paid a dividend of 10 cents per share, or \$50,000, at the office in Philadelphia, on the 15th. This is the 13th consecutive monthly dividend, aggregating \$650,000.

A Herald Prescott, A. T., special says: Shoane, known as "old Tex," a peculiar character familiarly known in the mining districts, was murdered on the trail leading from his ranch to Tip-top. He was found Sunday with two bullet holes through the body.

THE Black Rock quartz mine, a few miles southwest of Greenwood, El Dorado county, has gone into the hands of a Philadelphia company, who are preparing to start it up this spring. The Cedarburg mine, north of Greenwood, has also changed hands, and will at once be provided with hoisting works.

THOS. D. SARGENT, writing to the London Mining Journal, expresses the opinion that in most instances the stamps used on auriferous quartz are altogether too heavy; so heavy that much of the gold is beaten out into lamina so thin that they are floated away by the water, which is also used to excess.

THE New York Commercial Bulletin has the following among its railroad items: A dispatch from Albuquerque, of April 9th, from F. W. Smith, Superintendent of the Atlantic & Pacific railroad says: "Something should be done at once to develop the coal, which we have in large quantities. Parties are urgent to take it out. The sixth section of this railroad will be ready next week."

THE Southern California and Arizona Mining Bureau has been organized with headquarters at Riverside. The bureau will examine and report upon mines, make assays, and negotiate for the sale of mining property in southern California and Arizona. Following are the officers: General Manager, Dr. K. D. Shugart; Secretary, H. J. Rudisill; Treasurer, A. S. White; Superintendent, Prof. G. E. Bailey, M. E., formerly Professor of Analytical Chemistry in the University of Nebraska.

TAYLOR DISTRICT.—The Ward Reflex says the Monitor mine in Taylor promises to be the coming bonanza of that district. A vein of \$300-ore, four ft. wide, is now exposed. Taking in the second class-ore the vein is between 5 and 10 ft. wide. The vein which from the first laid flat has commenced to pitch into the mountain. Messrs. McGill, Briggs & Lyons, the owners, are familiarly known over that way as the Bonanza Kings of Taylor. We can stand a bonanza king or two in White Pine.

A NUMBER of our chloriders, says the Pioche Record, have their ore on the dumps ready to ship to Bullionville at a moment's notice. All the cars have been loaded and run on the side track, where they have remained for over a week, and the chloriders' patience is worn out. There is considerable more chloriders' ore in Pioche than a person has any idea of. Johnny Deek & Co. having at least a train load of ore. The men working in the Meadow Valley mine have large quantities of ore stored away in the drifts, and we learn that hoisting will commence in a day or two.

## USEFUL INFORMATION.

## Belmontyle Oil—What Is It?

It is an oil that prevents rust, tarnish or verdigris, without injuring the brightness of the polished metal. In short, it is a preventative of the oxidation of metals, and is, therefore, useful in preserving bright work on steam engines when not in daily use; for firearms, sewing machines, safes, saws, tools, skates, cutlery, etc. The oil is of a very greasy, slippery and filaceous nature; its odor is similar to that of mineral oils. When exposed to the air in open vessels a long time it will lose its slippery, filaceous nature, but not its preventative power against rust. Nevertheless, the keeping of the oil in well corked up tin or glass bottles is always recommended. It will draw into porous wood very briskly, deprive the same of its hygroscopic peculiarity and protect it against rot-tenness. Rust is by this oil sooner dissolved than by any other; mixed with water it will get a milky appearance and undergo a decomposition. With spirits of hartshorn it will form a clear fluid liniment. Very thin coats of this oil on metal will evaporate after a while, and leave a very thin lamella protecting the metal. This lamella when spread over with Belmontyle oil will be dissolved again.

Rooms where this oil is used, will be kept free of moths and other insects. It appears transparent, with a slight yellowish wine color, in small white bottles and not over half an inch in diameter; when the diameter is larger it is somewhat reddish. Its specific gravity is between .875—.890. A higher specific gravity infers adulteration; at 41° F. it becomes dim; at 37° F. crystals will appear in it; at 21° F. it becomes still and chilled; but by trituration will be changed into a thin fluid liniment, and at 43° F. its former clear transparent nature will be restored without leaving a sediment.

In reference to its application to steel and iron, we may say that a thin coat of the Belmontyle oil forms a very thin, dry and invisible lamella, preventing the metal from coming in contact with the air and moisture without diminishing its brightness. It can be easily removed by a second application of the oil, or by benzine. This article is therefore especially adapted for use on bright metal which needs protection from rust during storage or transportation, and in preserving parts of machinery, etc., while in course of fabrication. It also makes blined and browned work brighter, and hold the polish.

The oil proves efficacious in preventing rust on bright surfaces of machinery or goods that have to be transported by sea. Bright brass or copper work oiled with it will also retain its original color and brightness. When used on bronze the formation of verdigris will be entirely prevented, whether the metal be exposed to the weather or not, and the color remain unchanged. The cleaning properties of the oil are superior. It will remove gum, etc., immediately, and rust after the lapse of 24 hours; very rarely a second greasing will be found necessary.—*Boston Journal of Commerce.*

WORKMEN'S PANTALOONS often become too filthy to wear, on account of being saturated with oil and grease, long before they are really worn out. The following method of washing such articles of clothing, so as not to discharge the color, is recommended. It is impossible to wholly prevent fading, but if not left in the water too long the washing out of the dye will not be very great: Water 1 gallon, soap  $\frac{1}{2}$  lb.; boil to dissolve; add 2 oz. borax; dilute with about 8 gallons water; work the goods through as quickly as possible and rinse without ringing. An aqueous solution of 1 part copperas and 7 parts logwood extract may be used for reviving the faded color of cheap black goods.

HYBRIDIZED COTTON.—Experiments have developed a crop of hybridized cotton, which has been raised for several seasons, and which is worm-proof. The worms, a great hindrance to the cultivation of the ordinary plant, have never troubled the weed or foliage. It is claimed that the ordinary cotton plant has been hybridized with a certain weed, (the name of which and the process is a secret), and that when the cotton plant worm is placed upon this hybridize, it turns away in disgust, and absolutely refuses to remain or feed upon it. If there is truth in this reported discovery, it is a very important one.

NAIIS.—What are technically known as nails range from one and one-third to six inches in length, and from 800 down to 10 nails to a pound. But the genus extends upward, under the special name of spikes to two ft. or more in length, a single one of which will weigh from six to 15 lbs., and downward, under the name of brads, to one-quarter of an inch in length, and to 10,000 to a pound.

INDIA INK IN DRAWING.—Much trouble is experienced in the use of india ink from the fact of its drying so rapidly on the porcelain on which it is used. This trouble may be avoided by adding a few drops of glycerine to the ink.

ADHESIVE FOR BELTS.—A writer says a good adhesive for leather belts is printers' ink. "I have the case of a six-inch belt running dry and smooth and slipping, which latter was entirely prevented for a year by one application of printers' ink."

COLOR AND HEAT.—The following experiment was performed by Franklin to ascertain the absorption of light and heat by various colors. He took a number of little square pieces of cloth of various colors—black, deep blue, lighter blue, green, purple, red, yellow and white, and laid them down on the snow on a bright, sunshiny morning. In a short time the black, being most warmed by the snow, was sunk so low as to be almost below the stroke of the sun's rays; the dark blue almost as low; the lighter blue not so low as the dark; the other colors less as they were lighter, and the white remained on the surface of the snow. We thus learn that black cloths are not so fit to wear in a hot sunny climate as white ones.

MAKING HOLES IN GLASS AND PORCELAIN.—The operation of making holes and sections in glass and porcelain is often a troublesome and unsatisfactory one. The firm of Richter & Co., in Chemnitz, have found a way of so impregnating thin German silver disks (.59 to .98 inch diameter) with diamond, that when fitted to a quickly rotating tool, these cut through glass or porcelain in a few seconds, or effect any desired carving with great accuracy. With cylinders made on the same principle, round holes can be quickly and exactly made. The wear of the implement, even after much use, is hardly perceptible.

CEMENTING LABELS TO METAL.—For attaching labels to tin and other bright metallic surfaces, first rub the surface with a mixture of muriatic acid and alcohol; then apply the label with a very thin coating of the paste and it will adhere almost as well as on glass.

TO REMOVE OLD PAINT.—Slack three lbs. of stone quicklime in water, and add one lb. American pearlsh, making the whole into the consistency of paint. Lay over the old work with a brush, and let it remain from 12 to 14 hours, when the paint is easily scraped off.

## GOOD HEALTH.

## What Air Shall We Breathe at Night?

Many years ago Florence Nightingale assaulted the popular superstition against breathing night air with the unanswerable question, "What other air can you breathe at night?" Dr. Oswald in a late number of the *Popular Science Monthly*, enters upon the assault against this superstition, which survives every attack, upon no other ascertainable ground than that the less reason there is for a superstition the harder it is to kill it.

"Before we can hope," he says, "to get rid of the consumption with any chance of success, we have to get rid of the night air superstition. It is probably the most prolific single cause of impaired health, even among the civilized nations of our enlightened age, though its absurdity rivals the grossest delusions of the witchcraft era. The subjection of holy reason to hearsays could hardly go further.

"Beware of the night-wind; be sure and close your windows after dark!" In other words, beware of God's free air; be sure and infect your lungs with the stagnant, azotized and offensive atmosphere of your bed-room. In other words, beware of the rock spring; stick to sewerage. Is night-air injurious? Is there a single tenable pretext for such an idea? Since the day of creation that air has been breathed with impunity by millions of different animals—tender, delicate creatures, some of them—fawns, lambs and young birds. The moist night air of the tropical forests is breathed with impunity by our next relatives, the anthropoid apes—the same apes that soon perish with consumption in the close though generally well-warmed atmosphere of our northern menageries. Thousands of soldiers, hunters and lumbermen sleep every night in tents and open sheds without the least injurious consequences, men in the last stage of consumption have recovered by adopting a semi-savage mode of life, and camping out doors in all but the stormiest nights. Is it the draught you fear, or the contrast of temperature? Blacksmiths and railroad conductors seem to thrive under such influences. Draught? Have you never seen boys skating in the teeth of a snow storm at the rate of fifteen miles an hour? 'They counteract the effect of the cold air by vigorous exercise.' Is there no other way of keeping warm? Does the north wind damage the fine lady sitting motionless in her sleigh, or the pilot and helmsman of a storm tossed vessel? It cannot be the inclemency of the open air, for, even in sweltering summer nights, the sweet south wind, blessed by all creatures that draw the breath of life, brings no relief to the victim of aerophobia. There is no doubt that families who have freed themselves from the curse of that superstition can live out and healthier in the heart of a great city than its slaves on the airiest highland of the southern Apennines."

Is there not, the reader perhaps asks, danger in the malarious air of the Roman campagna or the Charleston meadows? Yes! There are regions where the air is poisonous. But the only way to escape the poison is not to live in such a region. You might as well allow sewer gas in your bath-room and expect to escape the poison by keeping the chamber door closed, as to live in a malarious swamp and escape the malaria by trying to live in an air-tight house. Any fresh air is better than any stale air.—*Ec.*

## Milk in Fevers.

EDITORS PRESS:—I have just read Mr. I. B. Rumford's advice in the *RURAL PRESS*, on diet in malarial regions; can agree with him as to using swine flesh. I prefer to do without meat when fresh mutton or beef is not to be had. But I am surprised that he includes milk and butter among the objectionable articles of diet, as my experience has led me to believe good milk beneficial in case of fevers, for I have been greatly benefited by its use whenever we have been fortunate enough to get a supply.

P. LOUCKS.

King's River, Cal.

RAW OYSTERS.—Dr. William Roberts, in an interesting series of lectures on digestive ferments, published in the *Lancet*, says: The practice of cooking is not equally necessary in regard to all articles of food. There are important differences in this respect, and it is interesting to note how correctly the experience of mankind has guided them in this matter. The articles of food which we still use in the uncooked state are comparatively few, and it is not difficult in each case to indicate the reason of the exemption. Fruits, which we consume largely in the raw state, owe their dietetic value chiefly to the sugar which they contain; but sugar is not altered by cooking. Milk is consumed by us both cooked and uncooked, indifferently, and experiment justifies this indifference; for I have found on trial that the digestion of milk by pancreatic extract was not appreciably hastened by previously boiling the milk. Our practice in regard to the oyster is quite exceptional, and furnishes a striking example of the general correctness of the popular judgment on dietetic questions. The oyster is almost the only animal substance which we eat habitually, and by preference, in the raw or uncooked state, and it is interesting to know that there is a sound physiological reason at the bottom of this preference. The fawn-colored mass that constitutes the dainty part of the oyster is its liver, and this is little else than a heap of glycogen. Associated with the glycogen, but withheld from actual contact with it during life, is its appropriate digestive ferment—the hepatic diastase. The mere crushing of the dainty between the teeth brings these two bodies together, and the glycogen is at once digested, without other help, by its own diastase. The oyster in the uncooked state, or merely warmed, is, in fact, self-digestive. But the advantage of this provision is wholly lost by cooking, for the heat employed immediately destroys the associated ferment, and a cooked oyster has to be digested, like other food by the eater's own digestive powers.—*Scientific American.*

MEDICAL USES OF FIGS.—Prof. Bouchut mentions some experiments he has made, going to show that the milky juice of the fig tree possesses a digestive power. He also observed that when some of this preparation was mixed with animal tissue, it preserved it from decay for a long time. The *Medical Press* refers to this fact, in connection with Prof. Billroth's case of cancer of the breast, which was so excessively foul smelling that all his deodorizers failed, but on applying a poultice made of dried figs cooked in milk, the previously unbearable odor was entirely done away with. Certainly the remedy is worth trying.

THE smokers are clamorous for "smoking cars" on the elevated roads of New York. It is encouraging to note a vigorous protest against the proposition in the editorial columns of the *Evening Post*, which says: "This demand the directors should peremptorily refuse to grant." It also declares that "habitual smoking at all times and in all places is already carried too far, and there is no good reason for encouraging still further a practice which injures many persons beside those who inordinately indulge in it." To all of which every well wisher of the race should say heartily, "Amen."

SUCH IS THE POWER OF HEALTH that, without its co-operation, every other comfort is torpid and lifeless as the power of vegetation without the sun. And yet this bliss is commonly thrown away in thoughtless negligence or in foolish experiments on our own strength; we let it perish without remembering its value, or waste it to show how much we have to spare; it is sometimes given up to the management of levity and chance, and sometimes sold for the applause of jollity and looseness.

In business, in home life, in social intercourse, in politics, there is a success worth striving for, which is the attainment of the immediate object in view; but there is something much higher, far more valuable, far nobler. It is the purity of character, the elevation of the purpose, the fidelity to principle, and perseverance of effort which are of themselves the real success of life, and shine through all the clouds of temporary failures.

THE EFFECTS OF GREEN WRISTLETS.—The Bridgeport (Conn.) *Standard* says that a gentleman in that city has discovered, after suffering for weeks from what the doctors called an eruption, that the trouble was caused by wearing a pair of green woolen wristlets. He visited several physicians before the cause of his trouble was known. The dye-stuff was analyzed and found to contain poison enough to kill several persons if taken internally.





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#### Passing Events.

The Legislature is in session at Sacramento, and has so far distinguished itself by cutting out the item of \$6,000 a year for two years for the State Mining Bureau. As that was the only thing before it relating to mining matters, it has not done much to foster the mining interest.

The weak hinge good cheer to us from all parts of the coast. Dispatches to the Associated Press from various points show that all through the interior a busy and prosperous summer is expected. People have begun to think owing to dull times past that California would continue to have dull times. This is by no means the case, however. The interior of the State through its producing forces is moving ahead vigorously. Mines are being opened in old camps as well as in new ones, and prospecting is going on in all directions. Now that spring has fairly opened an army of prospectors will soon be going the hillside in hopeful search of precious metals.

The most noticeable feature in mining circles at present, outside of the brisk stock market, is the Wood River excitement, which is causing many miners to leave this and neighboring States for that region. We have this week devoted considerable space to a map and description of the Wood River country, which will be found of use and value to any who are going to join the "rush." One thing this will do is to reduce the number of idle miners in some of the old camps of the coast.

The PRESS this week contains a very large amount of interesting and valuable matter for miners, which we hope they will appreciate. We are endeavoring to keep the PRESS up to a standard which will ensure its continued leadership of mining periodicals.

SENATOR FAIR has returned to this city. The length of his stay or his reason for coming are matters upon which the Senator is not to be interviewed. He is at the Palace.

#### State Miner's Hospital and Asylum.

The Governor has nominated and the legislature has confirmed the following trustees of the State miner's hospital and asylum: Solomon Heydenfeldt, Sr., George Hearst, B. B. Redding, of San Francisco; John Daggett, of Siskiyou, and Edward Coleman, of Nevada county. The first two mentioned, are for two years, the others for the four-year term. These trustees have general charge of the institution, appoint the superintendent, receive all real and personal property, etc. These trustees receive no compensation, and no appropriation is made by the State for building or maintaining the hospital, the whole thing coming from voluntary contributions. The town of Shasta has offered 200 acres of land in case the hospital is erected in that vicinity. It is hoped that other places beside Shasta will bid for the location. The State Treasurer will probably be appointed custodian for contributions, so no one need delay contributing on the plea that there is no one to receive the money. Mr. Daggett is a practical miner, at the head of the Black Bear and other Siskiyou mines. Mr. Coleman is one of the owners of the famous Idaho mine. All the others have been, or are identified with the mining interests of the coast.

The bill which establishes this hospital was drawn up by Mr. Joseph Wasson, of Mono county. It furnishes a framework or machinery whereby those who wish to contribute or bequeath to such an institution can do so. There was, up to that time, no laws permitting the State to accept donations for any purpose. This will now test the liberality, not to say gratitude and justice on their part, of that large class known as miners, by profession, even, exclusive of the class who have made their fortunes out of the mining interests of this coast, especially in this State and Nevada.

Were the common miners of California to-day alone to contribute the sum of one dollar, or even a "short bit," so to speak, the State Hospital proposed would, in a year or two at farthest, be an established fact.

There is scarcely a day in the year that the telegraph does not announce the death or crippling, disabling, etc., of from one to five men engaged in this perilous but most fascinating pursuit; especially is the danger incident to vein or deep mining more subject, tenfold, to accidents to limb and life than that of seafaring.

Vein mining is but in its infancy in California, the State having given birth to half a dozen other prosperous States and Territories, and on that score must still have a greater future than has been her past. It is rich in every mineral that enters into the arts and manufactures, outside of gold and silver, which metals are but partially developed.

Mr. Wasson, having originated the idea of the hospital, it remains for miners and friends of the mining to originate the hospital itself. The thing is nothing which the politicians are apt to get hold of, and the mining community, who are to be directly benefited, should contribute what it can in the good cause. We would like to see the hall set rolling by a good big lift from some one who has made his fortune out of the mines. But that need not keep back smaller sums. The beginning of the work has been made by the appointment of the trustees. The beginning of the contributions is still more important.

#### A Prize for Scientific Research and Invention.

The Royal Academy of Sciences of Turin, in accordance with the last will and testament of Dr. Cesare Bressa, and in conformity with the programme published in 1876, has announced that the term for competition for scientific works and discoveries made in the four previous years, 1877-80, to which only Italian authors and inventors were entitled, was closed on December 31st, 1880.

The academy has now sent notice to the California Academy of Sciences, and to other societies, that a new term for competition for the Bressa prize has begun, to which, according to the testator's will, scientific men and inventors of all nations will be admitted. The prize amounts to 12,000 Italian lire, or about \$2,340, so it is well worth contending for.

The prize will therefore be given to the scientific author or inventor, whatever be his nationality, who during the years included from 1879 to 1882, shall have, according to the judgment of the Royal Academy of Sciences of Turin, made the most important and useful discovery, or published the most valuable work on physical and experimental science, natural history, mathematics, chemistry, physiology and pathology, as well as geology, history, geography and statistics.

The term will close December, 1882. The prize will in no case be given to any of the national inventors of the Academy of Turin, resident or non-resident. The President of the Royal Academy of Turin is E. Ricotti. The Secretary of the class of physical and mathematical sciences is Ascanio Sobrero. The Secretary of the class of moral, historical and philological sciences is Gaspare Gorresio.

The product of the Star mine for March was \$26,969, which netted \$22,664.

#### The Mining Bureau.

Although the Assembly agreed to the \$6,000 a year for two years for the State Mining Bureau, the Senate rejected the item from the appropriation bill, after all Mr. Wasson's efforts to get it there. This action was in consequence of objection raised to the legality of the appropriation. The Bureau will therefore have to be managed on the funds coming from the tax or transfer of mining stock. At present the running expenses of the institution are: Salaries as follows: State Mineralogist, \$250 per month; Secretary, \$150; Chemist, \$125; janitor, \$75; rental of premises, \$175; stationery, postage, printing, freight, fuel, chemicals, gas, etc., about \$125. This foots up to a total of about \$900 per month, or \$10,800 per annum. Taking last quarter's partial revenue, as paid over to the Bureau, \$840.80 as a basis for computation, there will be a deficit of at least \$710.40 for the succeeding 12 months. A table prepared by the Licenses Collector shows the falling off in the 10-cent-per-share tax on stock transfers. The first quarter, ending January 1st, gave a fund for the support of the State Mining Bureau, amounting to \$1,353.98. The second quarter, ending April 1st, shows a decided falling off, but \$840.80 being collected. The tax was collected from the secretaries of 24 mining companies. The largest sums collected were: Alta, \$144 first quarter, \$32.80 second quarter; Mexican, \$95.50 first quarter, \$41 second quarter; Benton, \$97 first quarter, \$19.40 second quarter; Savage \$86.91 first quarter, \$42.80 second quarter. In only three cases did the amount increase in the second quarter over the first—in Eureka Con., \$17 first quarter, \$23.20 second quarter; Mt. Potosi, \$10.60 first quarter, \$33.70 second quarter; Navajo, \$13.30 first quarter, \$62.30 second quarter. A study of the tables result in the conclusion that the decreases in the revenue as collected by the tax of 10 cents per transferred certificate will go on, thus crippling the bureau. The present quarters may have to be given up, and the services of some of the assistants dispensed with in this case.

All mining corporations incorporated under the laws of this State are subject to the tax. There are 8,530 such companies in the State. The sums paid into the State Treasury from this source since the institution of the Bureau, have been as follows: Quarter ending April 1, 1880, \$1,341.60; July 1, \$3,920.60; October 1, \$3,522.70; December 31, \$2,989. Of the first quarter only a portion reverted to the Mining Bureau. It will thus be observed that there has been a diminution in each quarterly return. The revenue for the next quarter will probably show a decrease, according to Mr. Sinton's estimate, of at least 20%.

It is to be regretted that the \$12,000 was not appropriated, as a good deal of the work laid out will have to be abandoned for the present.

#### Mining Districts.

After all, the crucial test and proof of value of any mining region lies in its bullion product. A district may be widely advertised and its population rapidly increased under this influence; its ledges may be large and numerous; its situation advantageous; wood and water abundant; capital advanced to open it, railroads tap it; but if the mines do not produce bullion sufficient to pay expenses and a profit, it will gradually decline.

We should not, therefore, estimate the value of the mining properties of any region so much on the basis of common report or rumor, as on the result of the work. If one sees that the bullion shipments from a mine, group of mines, or district are regular and sustained he can make up his mind that those mines and that district are prosperous, and this may be the case even when little is heard of the mines or district, and when few people are in the vicinity outside of those directly employed.

Because there is a good deal of noise and talk about a district, and a good many people there; a hustling town, and a good many mines showing big assays, it does not follow that that district is going to pan out anything startling. Big assays do not make big mines, any more than talking about building a mill builds a mill.

At the end of the year, when the accounts are balanced, if these mines do not have some kind of a bullion-producing record, they will go to the wall. If their owners can dispose of them before the decline, it is good for them and bad for the purchaser. But for a mine to be a mine, it must produce something. Time was, in flourishing Comstock days, when mines were worked as stock jobbing transactions, the managers of which did not expect any bullion, and not expecting, were not disappointed.

But after the first six months or year of excitement about a region, it must produce bullion to live. After that no amount of advertising or puffing will keep it going without it yields coin. The miners will gauge its possibilities by that time, and will leave it to its fate. Capitalists, too, will follow the miners, as they always do. Capital is never a pioneer. The miners discover, open up and locate; capital follows and develops; and capital is not apt to flourish where miners do not.

The new districts coming to our notice every day, must, then, show us bullion as soon as they can. If they do not, people will drift back into old centers, where they know bullion is being produced, for it is those centers which will remain the most prosperous, even with no "excitement" to back them.

#### Damages from Mining Operations.

In the case of L. L. Robinson vs. Black Diamond Coal Co., decided recently by the Supreme Court, the principle involved was as follows: "The defendant, in working its mine caused deleterious substances to be deposited in a certain creek, whereby the land of plaintiff was injured. The Court held that defendant was liable in damages; and held further that the evidence on the question of damages being conflicting, and the estimate of the court below not exceeding that of some of the witnesses, the finding of the amount of damages would not be disturbed."

A paragraph headed "Mining Debris" has been going the rounds of the press, and was published in this journal among others, commenting on this decision, and giving an abstract of it, which gives an erroneous idea, owing to defective phraseology and a typographical error. It assumes, moreover, that the principles involved in this case are identical with those involved in the debris question, whereas the principles here enumerated are not by any means new. That is to say, the courts have held that where a miner has dumped debris onto a man's land and damaged said land, said miner must pay damages. And the miners have paid damages in such cases, and have purchased lands on which to dump debris.

But, as we have before stated, it is well understood that when the complainant can prove the direct damage from a mining operation, he can recover damages. It will be as well, as this does not seem to be very well understood, to give a resume of the particular case under consideration, as the decision will show how the matter stands.

It appeared by the evidence introduced on the trial of this case, that the plaintiff was, and for a long time had been, owner of a tract of land on the margin of the San Joaquin river, and that the defendant had been for several years prior to the commencement of this action, mining for coal about three miles distant, and at an elevation of 700 or 800 ft. above plaintiff's land. The Quercus creek runs from the mine in a deep gulch or ravine, until it reaches the low lands; and that the water of said creek, during the rainy seasons, is discharged upon and spreads over a considerable area of the plaintiff's land.

But when suit was brought against a number of miners collectively for general damages, the Supreme Court held that individuals must be separately sued and their injury proved upon them directly. That is to say, that where a number of miners threw their debris into streams, and it went upon other men's land, no one could tell what particular debris, or what particular portion came from any particular mine. Therefore damages could not be collected, and the burden of proof of direct damages rested upon the persons upon whose land the debris collected. Failing to prove this direct injury no damages could be collected.

The evidence introduced by the plaintiff tended to prove that the defendant deposited in said creek, at or near its mine coal screenings, ashes and other substances, which, during the rainy seasons, were carried and distributed by the water in said creek upon the land of the plaintiff, and that the value of said land was thereby greatly depreciated.

Judge Sharpetain, who delivered the opinion of the Court (which was concurred in by Judges Myrick, Morrison and Thornton), says:

"If the plaintiff was entitled to recover upon this evidence, the judgment of the Court below cannot be reversed on the grounds of insufficiency of the evidence to justify it, although the defendant introduced contradictory evidence. It is, however, claimed on behalf of the appellant that the plaintiff was not entitled to recover upon that evidence, which, it is said, only shows that the water charged with refuse matter descended upon the plaintiff's land in its natural course, and in obedience to the law of gravitation. If the evidence introduced by the plaintiff did not tend to prove anything beyond that, it failed to establish the defendant's liability for any damage which the plaintiff may have sustained by reason of the overflow of his land. But the plaintiff's evidence, as we view it, tends to prove another and very material fact, viz.: that said refuse matter was the product of the defendant's mining operations, and was deposited in said creek through agencies controlled by the defendant. And that although it is not responsible for the inundation of the plaintiff's land by the water of said creek, it was responsible for the deposit of the deleterious substances with which said water was charged through its agency upon said land. This does not in any manner involve the question of the defendant's right to mine or prosecute any other legitimate business upon its premises. It would not be claimed that the defendant could convey and deposit refuse matter from its mine upon the plaintiff's land by means of carts or cars without incurring liability for any damages which the plaintiff might suffer by reason thereof. And we know of no principle upon which it could be held that a person may escape liability by doing that indirectly which would render him liable if done directly.

"Upon the question of damages the evidence was conflicting, and as the estimate of the Court did not exceed that of some of the witnesses, the finding upon that point cannot be disturbed by this Court."



## History of Gun Cotton and Nitro-Glycerine.

[Written for the Mining and Scientific Press by E. M. KILMER, Chemist.]

## Number Three.

## Chemistry and Production.

All the organic nitro compounds bear in their production from certain organic bodies the same characters—namely, all these nitro combinations are produced from the original body by the exchange of a certain number of equivalents of hydrogen against an equal number of hyponitric acid. For instance:

Cellulose (cotton)  $C_{12}H_{10}O_{10}$  or  $C_{12}H_7O_{10}H_3$  changes into nitro-cellulose or gun cotton,  $C_{12}H_7O_{10}(NO_3)_3$  or  $C_{12}H_7O_{12}N_3$

Glycerine  $C_3H_8O_3$  or  $C_3H_5O_3H_3$  changes into nitro-glycerine  $C_3H_5O_3(NO_3)_3$  or  $C_3H_5O_9N_3$

Carbolic acid  $C_{12}H_6O_2$  or  $C_{12}H_3O_2H_3$  changes into picric acid  $C_{12}H_3O_2(NO_3)_3$  or  $C_{12}H_3O_8N_3$

Mannit  $C_{12}H_{14}O_{12}$  or  $C_{12}H_3O_{12}H_6$  changes into nitro-mannit  $C_{12}H_3O_{12}(NO_3)_3$  or  $C_{12}H_3O_{18}N_3$

Here we have four of the well-known high explosive bodies, and in each case we find three equivalents (or the multiple of three) of hydrogen replaced by three equivalents of hyponitric acid.

Gun cotton looks like ordinary cotton, nitro-glycerine looks like glycerine, and nitro-mannit like mannite, but their chemical properties are vastly different. We shall speak in this chapter of the properties of nitro-glycerine. The nitro-glycerine is produced by the action of concentrated nitric acid on glycerine, during which action the glycerine takes up the nitric acid, and water is eliminated. The chemical reaction is as follows:

$C_3H_8O_3 + 3(NO_3) = C_3H_5O_3(NO_3)_3 + 3(H_2O)$   
Glycerine. Nitric Acid. Nitro-Glycerine. Water.

It is eminently necessary that the nitric acid should be employed in a very concentrated state. In the process of manufacture it is necessary to have the water which is produced in the above reaction absorbed, and that is accomplished by mixing the nitric acid with sulphuric acid.

The practical production of the nitro-glycerine therefore is accomplished by the treatment of glycerine with a mixture of concentrated nitric and sulphuric acid, in which treatment the sulphuric acid plays a secondary role, and by the absorption of the eliminated water it maintains the surplus of the nitric acid in a concentrated condition.

Different chemists employ different proportions in their mixtures of nitric and sulphuric acids, and also in adding the glycerine.

In the production of nitro-glycerine there is a very strong elevation of temperature, which must be avoided, as it may lead to explosions. There are also different methods employed to avoid this elevation of temperature.

According to Sohrero, 2 volumes of sulphuric acid of 1.831 specific gravity, and 1 volume of nitric acid of 1.525 specific gravity, are mixed, permitted to cool, and into this mixture half a volume of glycerine, of a very syrupy consistency, is introduced with constant stirring. The mixture is again cooled, and after having become turbid and been separated into two layers, poured into 15 or 20 times its bulk of cold water. The oily nitro compound sinks quickly to the bottom, is freed from unchanged acid and glycerine through repeated washing with water, and hastily dried in vacuo.

Praeger & Bertram add 1 part by weight of glycerine to 8 parts of a mixture of 1 part of concentrated nitric acid and 2 parts of fuming sulphuric acid.

Liebe recommends to pour 1 part by weight of glycerine into a mixture of 2 parts of nitric acid of 1.525 specific gravity, and 4 parts of concentrated sulphuric acid, to keep the mixture below 75° F., and to dry the washed nitro-glycerine in the steam bath. There are various methods proposed, but on working on a large scale, the process is carried on as follows:

The manufacture of nitro-glycerine usually takes place in three wooden sheds of light structure, separated from one another by strong earth banks of 25 to 30 ft. in thickness at their base. The walls and roof are lined with straw, and the temperature, by means of hot-water pipes, is kept day and night at about 60° Fahr.

In the one shed the glycerine is brought together with the mixture of acids; in the second shed the nitro-glycerine is poured into the water, and otherwise washed; in the third shed the complete elimination of acid from the oily compound is effected, and eventually the nitro-glycerine is worked up into dynamite.

These sheds are sunk into the ground, so that their flat roofs are barely above the level of the ground, they are lit up by reflecting lamps placed outside on the roofs; the floor is covered with fine sand. At some distance from these sheds are the huts in which the cartridges are made. They, too, are separated from one another through earth banks, and so is another shed, in which the packing takes place. Quite away from all these buildings are the store-houses, sunk into the ground. There are usually also cellars for keeping the ice, which latter serves for cooling the wash water. The storing of the raw glycerine and the sulphuric acid requires no special precaution.

Nobel's arrangement for making nitro-glycerine is very perfect, as large quantities can be produced by it at a time, as much as 3,500 lbs. in one operation, and to accomplish it, only a few

hours are required, and under the supervision of an able man the operation can be considered comparatively safe, as he keeps his mixture cool, and avoids in this way the great danger of the nitro-glycerine igniting and causing explosions. I shall enumerate the way the nitro-glycerine is manufactured in some large establishments on the Continent.

In one of the largest dynamite factories in Europe, where the daily production is over two tons, the nitro-glycerine is prepared in the following manner: 1,300 lbs. of nitric acid of the specific gravity 1.48 are mixed in four cast iron pans with 2,600 lbs. of sulphuric acid; this mixture, which is left to cool for a day, serves for the treatment of 630 lbs. of glycerine. This acid is drawn from the pans into a wooden cylindrical vat, of about six ft. high and three and one-half ft. in diameter, lined inside with thick lead and containing along its lining two spiral lead pipes of about one inch diameter, which reach from the bottom to the top. Each of these spirals, or worms, forms a system by itself through which cold water circulates, and one may serve as substitute for the other in case one gets out of order. The mixture of acids is stirred first by itself in this vat; the stirring is effected by two iron disks covered with lead, disk and covering being perforated, which glide up and down on a vertical iron shaft, the gliding motion being effected by pulling the rope attached to the disks over a pulley; the two or three workmen who perform this task stand at a distance of 30 or 40 ft. from the vat, behind a strong earth bank. When the acids have been introduced into the vessel, and the agitation has commenced, water of the temperature of about 25° F. is let into the worms, the temperature of the acid in this way being maintained at about 50° F., as may be ascertained from a thermometer which reaches through the lead cover of the vessel into the acid. The glycerine, which is kept in a zinc tank on the roof of the shed in which the mixing vat is, is now allowed to run into the latter vessel. The flow is regulated by means of a tap, and also by letting the glycerine first run into perforated zinc boxes, placed on the lid of the mixing vat, and corking up, if occasion requires, some of the perforations. As soon as the glycerine falls in-

to the acid the temperature rises at once, but by carefully regulating the supply of glycerine it may be kept at about 60° Fahr.

It is advisable not to allow the temperature to rise above that degree, though experience shows that a higher temperature yields a larger quantity of nitro-glycerine. It requires, according to the season and the temperature of the cooling water, two to three hours for 630 lbs. of glycerine to pass into the mixing vat; the stirring must not be stopped for a moment during the process. When all the glycerine has been added to the acids, the mixture is at once drawn off through a leaden pipe to the so-called wash shed, where it passes into a tank about eight ft. high and 12 ft. in diameter, which is half filled with cold water.

The inlet tube carries a sieve, to retain lead sulphate that may have been brought from the mixing vat. Whilst the nitro-glycerine flows in, stirring with wooden poles is begun, and continued until the nitro-compound has settled below the dilute acid. The bottom of the wash tank is slightly inclined, so as to allow a complete drawing off of the nitro-glycerine. The outlet taps are of stone-ware. The nitro-glycerine is now twice washed with water, freed from acid and lead sulphate, and finally washed with water, to which some sodium carbonate has been added.

But even after this purifying process there remain traces of acid; to eliminate these the nitro-glycerine is transferred to a third shed, where it is agitated for about an hour in a rotating vessel called a butter machine, with about 50 lbs. of a concentrated solution of sodium carbonate; after this time it will no more reddens litmus paper. It is now separated from the alkaline solution, filtered through felt, and collected for further use in leaden reservoirs.

The yield differs greatly according to the condition of the raw glycerine, the concentration of the acids, and the temperature. The yield of nitro-glycerine falls generally below the theoretically calculated quantity. This shortcoming is due to the formation of glycerides, which dissolves in the wash water. As a rule, the yield in winter is greater than that in summer.

The above is a system employed by some continental manufacturers, and notwithstanding the precautions taken against the accidental rise of temperature during the production and washing of the nitro-glycerine, some very serious explosions during its manufacture have not

been unfrequent; but Nobel has adopted a method of operation which, so far as experience goes, appears not to involve any special elements of danger if properly applied, and also presents advantages from an economical point of view, besides promoting the attainment of uniform results; and to his credit it must be said that when he made his first trial with his new apparatus he certainly exhibited a great deal of boldness and pluck, as it was a question of converting several hundred weight of glycerine into the explosive compound in a single operation. His mode of operation is successfully carried out by the Giant Powder Co. of San Francisco. The plan pursued by some of the other companies established near this city differs somewhat in its arrangement.

A series of small iron kettles, or pots, are arranged in a trough, each provided with a stirrer, which receive their movement from a common shaft which is revolved by a man stationed outside of the building. The pots are charged with the acids, and the glycerine is supplied either from a common reservoir by small outlet pipes, or above each pot is a small vessel containing glycerine, from which the same runs in a small stream into the acid mixtures.

The iron pots are surrounded by a running stream of cold water while the reaction is going on and stirring has to be constantly kept up. After the reaction is complete the pots are taken up and their contents dumped into large tanks filled with water, where the nitro-glycerine separates and is afterwards washed.

As simple as this operation may appear, the writer earnestly warns anybody who is not experienced in the matter to undertake any trials, as there are points connected with the manufacture of nitro-glycerine which can only be acquired by practical experience, and even then it is fraught with danger.

In the next issue, Mr. Mowbray's, of Mass., process of manufacture will be given, as it has certain features worthy of note.

NEW MAIL FACILITIES.—Within the past 30

days there have been 64 new postoffices established on the Pacific coast, and there have been 33 discontinued. During the same time, Wells,

Fargo & Co.'s express has established 51 new offices, and discontinued but one. These figures show that new regions are being settled up rapidly on this coast, as around each one of these postoffices, a community has grown up which demanded the mail and express facilities.

We see by the Pacific Coast Postal Index, that there have been in the same time 45 changes in the arrival and departures of mails at this city, which is mainly owing to the new overland mail connection by the southern route. There have also been 120 changes in foreign postal rates, affecting third and fourth-class matter. Five countries have entered the postal union in the last 30 days.

"SMALL MINERS."—The following item, from the Oroville Mercury, is suggestive to those persons who sit around bar-room fires and growl about hard times all winter. "Men are coming into this city every day with small batches of gold dust that they have taken out of their claims in the foothills in the winter. The claims are generally in the bed of small creeks, and if their owners were able to bring water to them, would prove valuable property. A person has no idea of the amount of gold taken out during the winter months by these small miners. Some of them bring it here and sell it to the bank. But a large number carry it to the nearest stores and trade for provisions. The season, however, is nearly over, and they must quit work until the next rains."

MINING PATENT DECISION.—In the Leedville, Col., case of the Com promise lode against the American lode, the Secretary of the Interior has decided that objection to the prima facie sufficiency of an adverse claim, received and filed by the Register within the period of publication, cannot be heard in the Department when the party has allowed the 30 days prescribed by law for the commencement of legal proceedings to expire before presenting such objection, and has actually been brought into Court upon the suit of an adverse demand. In such a case, the proceedings for a patent will be stayed to await the judgment of the Courts, and all defenses must be presented to those tribunals expressly authorized by the United States statutes to try the question of the right of possession.

## The Pelton Water Wheel.

The engravings on this page represent the water wheel recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by L. A. Pelton, of Camptonville, Yuba Co. Cal. Fig. 1, shows the wheel on its frame with the nozzles, and the small engraving under it shows the bucket. Fig. 2, is an enlarged view of the peculiar buckets, on which the efficiency of the wheel depends. The buckets are three times the stream's diameter in width. Under heads of water of 75 to 800 ft., the inventor guarantees this wheel to excel the turbine or other wheels. The following are the conditions under which it was tested, as given us by Mr. Pelton:

"The work done was measured with a Prony dynamometer. The fall of the water was accurately ascertained; its velocity at the nozzle was 93% of that due to gravity, seven per cent. being lost by friction in the conduit. After leaving the wheel the water was caught in a tank, and the cubic ft. used ascertained. Under the above conditions, this wheel utilizes 78% of the theoretical power, which per cent. will be found in the tables of horse-power. With a conduit of suitable size, the friction would have been less, and the wheel's per cent. of efficiency greater. The above result is due to the peculiar shape of the buckets used; they do not reduce the water to a spray, but divide and deflect it outward and backward, in such a manner that a part of the impact and the whole reactionary force are utilized without any part of the water coming in contact with the bucket following—a decided improvement on buckets heretofore used. Furthermore, the per cent. of efficiency remains constant through great variations in the amount of water used—another important factor in the make-up of a good wheel. These buckets can be taken off in transportation, thus avoiding breakage; and, when worn out by sand in the water, can be replaced by new ones; also can be applied to wooden wheels when desired."

To those desiring it, Mr. Pelton will send a circular in which is a table giving the diameter, revolutions, water used and horse-power of the various sizes of wheel, under different heads.

These wheels are not expensive, the smallest sized ones being about \$60, and from that up to \$375, the price including shaft, pulley box bolts, nozzle and gate. For miners' use this wheel seems very handy and well adapted. It can, of course, be put to any work for which wheels are used.

## Advertising Mining Companies.

We have been credited here in California with blowing our own horns pretty well, and making the most of what we have. And we have also been credited with sharp ways of doing business in mining stock transactions; and it has been further stated of us that we have a happy way of putting our mines on the market in an attractive style, so that the less valuable the property is the more likely it is to sell well. We will make a partial acknowledgment of these things, but we will, for once, confess ourselves outdone by the East in the matter of advertising mines and stock. We have come across one example in a circular which arrived on the benighted Pacific coast this week from New York, which shows us that we are to be taught, among other things, how to float mining shares. Leaving out the large type, the display lines, and the name of the company (unimportant features), here it is:

"There is a tide in the affairs of men, which taken at the flood, leads on to fortune." A fortune is within your reach! Put forth your hand and grasp it firmly at once. Blank Mining Co., incorporated under the laws of the State of New York. Principal office, N. Y.

Write immediately for a prospectus, which contains full information regarding the great enterprise which is interesting to the entire civilized world.

This opportunity is now offered for a short time only—a limited amount of the stock of the company is for sale at only \$2 for a full share. By investing in this enterprise you are certain to make money, and will become identified with the greatest interest in the world.

"Do not let your chances, like sunbeams, pass you by."

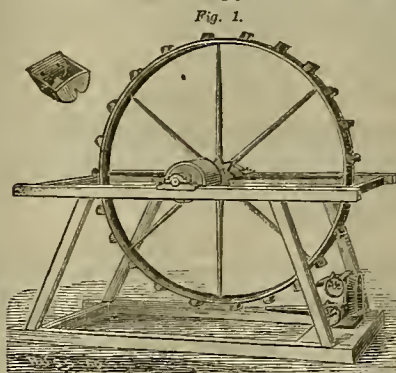
Every stockholder can rely upon making money.

The company, when they have provided sufficient capital to put up a 20-stamp mill, can earn profits sufficient to give every stockholder 30% dividends, and place additional stamps on the property, which, within two years, will probably enable them to earn 100% to 150% dividends on the stock.

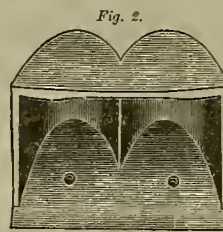
Every dollar invested will represent a dollar in property; and, when stocked with machinery, the property will be worth many times its cost.

Full information furnished by addressing, etc.

We think this advertisement is a little ahead of anything ever seen on this coast. It will probably be noticed that it omits any mention of such unimportant facts as location of the mine, number of shares, size of vein, depths of shaft, etc., class of ore, whether gold or silver, etc.; but it sounds well, and, moreover, has a quotation from Shakespeare. Even the names of directors and superintendent are omitted. Some persons may think we are joking, but this advertisement is a bona fide one, and we give it as an example of the way such things are managed by some people in the East.



THE PELTON WATER WHEEL.





**GLUE.**—A glue ready for use is made by adding to any quantity of glue, common whisky, instead of water. Put both together in a bottle, cork it tight and set it for three or four days, when it will be fit for use without the application of heat. Glue thus prepared will keep for years, and is at all times fit for use, except in very cold weather, when it should be set in warm water before using. To obviate the difficulty of the stopper getting tight by the glue drying in the mouth of the vessel, use a tin vessel with the cover fitting tight on the outside to prevent the escape of the spirit by evaporation. A strong solution of isinglass made in the same manner is an excellent cement for leather.

**RAILROAD MEN'S WAGES.**—Conductors in the Oregon Railway & Navigation Co.'s service receive \$95 per month; engineers, \$90, \$100 and \$125; brakemen, \$66; firemen, \$66; Chinamen, \$1 a day, board themselves; white men, \$1.85 a day.—*Ec.*

Nevada railroad men are the best paid in the world, excepting perhaps, those on the Isthmus of Panama. On the Central Pacific conductors get \$115 a month; freight conductors, \$90; brakemen, \$70; engineers, \$4.69 a day; firemen, \$2.80; Chinamen, \$1; white men, \$2. On the V. & T. R. R. engineers get \$5 a day.—*Reno Gazette.*

**THE RIGHT WAY.**—The Arizona Mining Journal calls attention to a feature in Meyer's district and says: "This feature, which calls for special notice, is the earnestness of those engaged in developing the mines. They do not bore the visitors at every corner with the fabulous wealth hidden in their prospects, but have gone honestly to work to find out for themselves what they have under ground. This is the true policy, and it will be found to pay well in the end."

The former Mission of Tucson, Arizona, was probably founded in 1750 or 1751. Tumacacori and Calahasas were founded about 1754; Puelita and San Andreas about 1798, and San Pedro (Fort Yuma) and San Pablo, about 1780.

**TAMERLANE.**—Joseph Tomson, over from Tamerlane for the first time in several months, reports that he has developed a vein of ore seven ft. wide in the Baltimore, and has taken out several tons of ore that will go about \$150.

In Pinal county, Arizona, since 1875, there have been 2,334 mining locations recorded, and 2,521 transfers of mining property have been made.

## Business Directory.

WM. BARTLING. HENRY KIMBALL  
**BARTLING & KIMBALL,**  
BOOKBINDERS,  
Paper Rulers & Blank Book Manufacturers  
505 Clay Street, (southwest corner Sansome),  
SAN FRANCISCO

**JOHN A. CHURCH, E. M. PH. D.**  
MINING ENGINEER,  
Room 75, 115 Broadway, New York.  
Agent for PADDOCK'S Ore Dressing Machinery.  
Mining Machinery supplied.

**San Francisco Cordage Factory.**  
Established 1856.  
Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarrad Manila Rope, Hay Rope, Whale Line, etc., etc.  
Extra sizes and lengths made to order on short notice.  
**TUBBS & CO.,**  
611 and 613 Front Street, San Francisco

Books for Miners and Millmen.

**KUSTEL'S CONCENTRATION OF ORES** (of all kinds), including the Chlorination Process for gold-bearing sulphurets, arseniures, and gold and silver ores generally, with 120 lithographic diagrams. 1867. This work is unequalled by any other published embracing the subjects treated. Post-paid, \$7.50. Printed and sold by Dewey & Co., S. F.

**AARON'S TESTING AND WORKING SILVER ORES.**—Illustrated. 114 pages. 1876. A useful and practical work, free from technicalities and extremely serviceable for miners' use. Post-paid, \$2. Published and sold by Dewey & Co., S. F.

**COPP'S HANDBOOK OF MINING LAWS.**—Containing the U. S. Mining Laws, Digest of Decisions, Forms, etc., 1877. Pocket size, and very handy and convenient for miners. Post-paid, \$1.00. Sold by Dewey & Co., S. F.

A New Edition.

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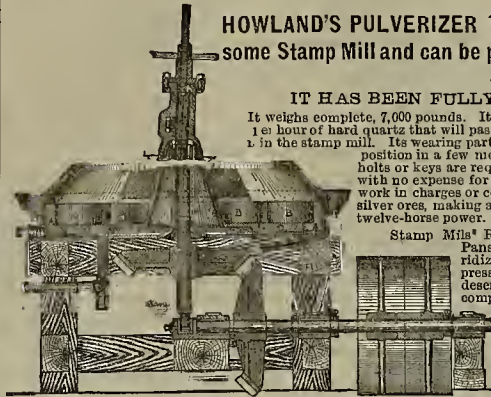
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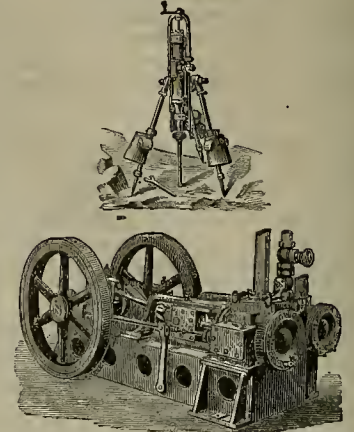
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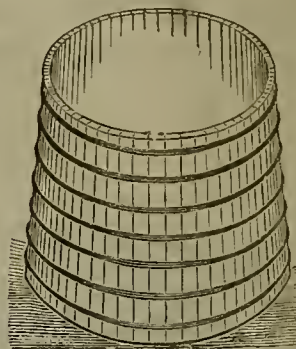
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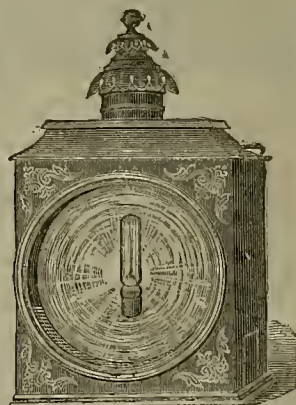
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING APRIL 5, 1881.

- 230,593.—ADVERTISING DEVICE—Wm. Akin, S. F.  
230,699.—HARROW—F. Batchelder, Sacramento, Cal.  
230,726.—CABLEWAY—H. Casbolt, S. F.  
230,761.—STEERING APPARATUS—J. Gates, Portland, Or.  
230,807.—PULP MACHINE—R. B. Lane, Stockton, Cal.  
230,813.—FOG HORN—H. C. Langrehr, S. F.  
230,814.—DRAWING FLAX—F. Mahler, S. F.  
230,815.—TELEPHONE—J. N. Matlock, S. F.  
230,860.—ICE MACHINE—C. C. Palmer, Oakland, Cal.  
230,844.—FEMER—L. A. Richards, Grayson, Cal.  
230,877.—TICKET CASE—T. W. Schwamb—Sacramento, Cal.  
230,680.—FLAGSTAFF HOLDER—B. Smith, S. F.  
230,877.—FRICTION BRAKE—A. J. Stevens, Sacramento, Cal.  
230,897.—SHUTTER WORKER—T. Wagner, S. F.
- FOR THE WEEK ENDING APRIL 12, 1881.
- 230,915.—BOOT—A. Altmayer, S. F.  
240,070.—SPOKE-SHAVE—L. Bauer, S. F.  
240,111.—FRUIT DRIER—W. C. Evans, Myrtle Creek, Or.  
240,115.—STEERING APPARATUS—J. Gates, Portland, Or.  
240,127.—FLOW—A. Haskins, Davisville, Cal.  
240,160.—WAGON BRAKE—D. E. McKee, Potter Valley, Cal.  
240,197.—FRED WATER HEATER—J. S. Stevens, Sacramento, Cal.  
239,994.—CLEANING GRAIN—S. Truax, Walla Walla, W. T.

\* List of Canadian Patents issued to Pacific Coast Inventors, from October 9, 1880 to March 10, 1881.

- 11,872.—EXPLOSIVE COMPOUND—Max Tschirner, S. F., Cal., Oct. 13, 1880.  
11,919.—BRAN PACKING MACHINE—W. L. Williams, San Diego, Cal., Oct. 30, 1880.  
11,920.—ORE CRUSHERS—F. A. Huntington, S. F., Cal., Oct. 30, 1880.  
11,009.—VALVES FOR WATER CLOSURE—Thos. Hennessy, Oakland, Cal., Nov. 13, 1880.  
12,047.—PURIFYING FAT AND OILS—Alex. W. Winter, S. F., Cal., Nov. 29, 1880.  
12,077.—CHURCH—Geo. W. Freeman, Rocky Point, Cal., Dec. 2, 1880.  
12,121.—SAFETY NETS FOR VEHICLE AXLES AND ON WRENCHES—Hy. Anderson, S. F., Cal., Dec. 14, 1880.

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### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**SPOKE-SHAVE.**—Louis Bauer, S. F. Patented April 12, 1881. No. 240,076. This improvement in spoke-shave consists in a novel method of holding and clamping the blade of the shave in place between two clamping jaws, so that every style of blade may be held in place and may be adjusted to or from the plate or cage, which serves as a gauge. The invention further consists in a means for setting the blade to or from the gauge plate, so as to regulate the cut. The construction patented enables the inventor to use a rough stick for a number of cutters, and they may be worn down to a narrow blade before being cast aside. The tool is especially valuable for working leather on account of its delicate and easy adjustment.

**TIRE UPSETTER.**—John E. Tiffen, Redding, Cal. This invention relates to a tire upsetter or shrinker, the novelty of which is in a peculiar arrangement of parts whereby one actuating lever is made to do the work, the whole being simple and easy of construction, combining with these advantages great strength without great weight. A base bar is bolted to a bench or block; this bar has diverging arms, to the ends of which other arms are pivoted, being made to converge, and are pivoted together and are also fastened to a slide having guides, the same pivot being made to join the arms together, and both to the slide. The tire is placed in jaws formed by the extreme ends of the arms and clamps having a corrugated surface. This device gives great power and is operated by one movement of the lever.

**WAGON BRAKE.**—David E. McKee, Potter valley, Mendocino county, Cal. Patented April 12, 1880. No. 240,160. This improvement in wagon brakes consists in so constructing the brake that it may be operated by the weight of the wagon bed and load. On the front bolster is a roller, and the rear bolster is a rocking one, the body resting on the rocking bolster and the rollers. From this rear rocking bolster extend levers, bent downward. In front of the rocking bolster is a roller journaled on staples, said roller being provided with downwardly projecting cranks. Rods connect with both pairs of downwardly projecting levers, and connect with the brake bar. When the wagon is going down hill the weight of the body, with or without a heavy load, will cause it to slip forward, the roller permitting, and will draw the levers so as to put on the brake. The brakes being on the running gear can be used for any wagon simply by changing the bed. Stops prevent the bed going too far ahead or back. A foot brake attachment is also used with them for stopping on an up grade.

Fifty guns were fired at Prescott, Arizona, in honor of the court's decision in favor of the California Mining Co.

### Wood River.

CONTINUED FROM PAGE 257.

A correspondent of the Eureka Sentinel has this to say about the route. "A word of advice to those who desire to come to this region. I see that there are a good many axes to grind by station-keepers and ferrymen. It is generally conceded here that, while travelers are able to come from whatever direction they choose, the route via Ogden and Blackfoot is the only feasible and comfortable one. It saves a number of hours of hard staging, and actually the shortest by from 40 to 50 miles. It also avoids this possible danger of spring floods and consequent delay. Besides, it passes through an interesting country. But I am not capping for any stage line."

Another correspondent, this time of the Carson Appeal, who went by the route mentioned, gives the following charges: "The fare from Carson to Blackfoot, including meals and sleepers on the Central Pacific and Northern railroads, is \$66.75, apportioned as follows: Carson to Reno, \$2; Reno to Ogden, \$44.75; Ogden to Blackfoot, \$16; meals, \$4. The stage fare from Blackfoot to Bellevue is \$25; meals, \$1 each, and lodgings (on the floor of a log cabin), 75 cents per night."

One feature of this region is an attractive one to miners, and is, perhaps, one of the principal reasons for the rush, viz., the mines are rich on the surface, and the country has not been much prospected. The ore can be easily and economically smelted. The veins are from one to two ft. wide, and the ore averages from \$70 to \$100 per ton. The principal town, Bellevue, some people think will take rank with Leadville or Tombstone, in its sudden enlargement. But Bellevue does not take all the visitors. There are many camps lying contiguous and tributary to it, that they absorb the surplus population, and one hardly knows whether the strangers have gone. An old Nevada county miner, G. W. Hobart, writes from Bellevue to H. A. Lord, of Nevada City, a letter which is published in the Transcript, from which we take the following facts:

"I arrived here on the 5th, eight days from Kelton, and it was a rough trip you bet, walking and pushing a horse over the 45 miles between Little Wood river and this place. We had to wade in mud and water belly deep in some places. Meals on the road are miserable and cost a dollar apiece. There is very little food on the table and it is dirty at that. Bellevue is a good place for its age, being situated on a bench overlooking Wood river and in front of the mountain, and containing about 500 people. The population is rapidly increasing, and as soon as the roads are in good condition I am satisfied there will be the greatest rush to the place ever seen on the Pacific coast. Old prospectors say there is a mineral belt 200 miles long and 60 wide. That being the case there will be room enough for all who come."

"The ledges here remind me of those in the Austin district. As far as prospected they show small pockets assaying from \$100 to \$2,000 a ton. The ore can be sold on the ground for 90% of the assay value after deducting \$40 a ton for transportation and working. It is heavy in galena and hornblende. Many locations have been made, but not much thorough prospecting done. "The snow is all gone in Bellevue, and the most of it has disappeared from the west side of the foothills. Above the foothills there is too much for prospecting."

There is hardly any doubt but that most of the miners will get there too early to do the work they expect to, but as most of them have made up their minds already as to when to start, it is scarcely worth while to say much. Neither is it probable that any advice as to staying where they are if they have any steady engagement, would be listened to. We therefore content ourselves with giving as much information concerning the country as we have been able to gather; and print also the mining laws of the Territory.

### The Mining Laws of Idaho.

As a great many persons are now going to the Wood River, Sawtooth and Yankee Fork regions, in Idaho, it is just as well for them to know what the mining laws of the Territory of Idaho are. We therefore append them in full, as passed by the Legislature in February of this year, so anybody going there can clip them out for future reference:

*An Act relating to the location and recording of mining claims.*

SEC. 1. The mining claims heretofore located upon veins or lodes of quartz or other rock in place bearing any of the precious or other metals, mentioned in section 2,320 of the Revised Statutes of the United States, may extend three hundred (300) ft. on each side of the middle of the vein or lode: Provided, That where the locators have set their stakes, posts or monuments, described in the next section, to indicate the line of the vein, ledge or lode, said stakes, posts or monuments shall be taken for the purpose of said location, to mark correctly the line thereof, and each line shall not be afterwards changed so as to affect the rights acquired or interfere with any location made subsequent thereto.

SEC. 2. The locators of any mining claim shall at the time of making the location place a substantial stake, or post, not less than four inches

squares, or in diameter, at each end of the ground claimed and as near as practicable along the course, or line, of the vein, or lode, and also a similar stake, or post, at each corner of the location. Such stakes or posts shall be at least four ft. high above the surface, and shall be marked distinctly with the name of the claim. The notice of location heretofore mentioned, shall be conspicuously attached to one of said centers and posts, so that the same may be easily read; or it shall be conspicuously posted in like manner at the point of discovery and prospecting work on the claim. Where stakes or posts cannot be conveniently had, well-built monuments of stone of the like height above the surface will answer the purpose of stakes or posts, but the notice must be so placed on the side of said monument as to be read easily.

SEC. 3. The notice shall contain the date of the location, the name of the locators, the names of this claim, ledge or lode, the quantity in ft. claimed along the ledge or lode, the width claimed from the middle of vein, and shall also give such a description of the locality of the claim, by reference to natural landmarks or fixed objects, and contiguous claims, if there be any, so as to render the situation of the same reasonably certain from the letters of the notice itself.

SEC. 4. Every claim shall be recorded within fifteen (15) days from the time of the posting of the notice, in the district in which the same shall be located, or at the nearest office to the claim. For the convenience of the prospectors and locators, the County Recorder of the several counties shall appoint a deputy at any place where he may deem it necessary, and at all places more than ten (10) miles distant from an existing office, whenever ten or more mining locators interested, shall petition for the appointment of such deputy. Upon the failure of any Recorder to make the appointment of a deputy for ten days after a petition in writing shall have been presented to him, the resident miners at such district may appoint temporarily one of their number to act as Recorder of the district, whose records shall be as valid as if made by a deputy, and whose records shall be entered by the Recorder, as herein required. Provided, That whenever at any time afterwards the Recorder shall appoint a deputy for such district or place, the authority of the person elected by the resident miners shall cease.

SEC. 5. At the time of presenting a notice of location for record, or within five (5) days thereafter, one of the locators named in the same, shall appear before the deputy, and make and subscribe an affidavit in writing, on or attached to the notice to be administered by said deputy, substantially in the following form, to-wit:

Territory of Idaho, County of —, SS. I, —, do solemnly swear that I am acquainted with the mining ground described in the notice of location herewith, called the — ledge or lode, or claim, and that the ground and claim therein described, or any part thereof, has not, to the best of my knowledge and belief, been heretofore located according to the laws of the United States and of this Territory, or if so located, that the same has been abandoned or forfeited by reason of the failure of each former locator to comply with the requirements of said laws.

Subscribed and sworn before me this — day of —, A. D. 18—. A. B.—

SEC. 6. The notice herein required to be recorded is a copy of the notice placed on the claim, or substantially a copy of the same. It shall be recorded by the deputy appointed for the purpose as above provided (when the legal fee therefor shall be tendered) in a book, to be kept for that purpose. Said book shall be indexed with the names of all locators arranged in alphabetical order, according to the first or surname of each. The fee to be tendered for making said record, administering the oath to the locator, and certifying the same, for indexing the names appearing upon the notice, and to include the recording of the notice by the recorder, as hereinafter required, and the indexing by said recorder, shall be three (3) dollars, which fee shall be equally divided between the recorder and the deputy, or person acting under an election, as herein provided; and no other or additional sum of money shall be demanded or received by either or any of them for any services connected with the recording of any notice of location made pursuant to the requirements of this act.

SEC. 7. The deputy recorder of mining claims of each district, or the person elected as hereinabove provided to make the record in case of the failure of the recorder to appoint a deputy, shall at least once in each month, transmit to the recorder, at the county seat, all the notices of location filed with him for record and not previously transmitted, which shall at once be recorded by said recorder, in a book to be kept in his office, and be known as the Book of Mining Claims. The names of all persons appearing in every notice of location shall be indexed by the recorder, said names being arranged in said index in alphabetical order, according to the first letter of the surname of said locator.

SEC. 8. The deputy recorders provided for in this act shall not, by virtue of the provisions hereof, be authorized to perform any other than the special duties herein specified. They shall keep an official seal, and the records in their custody shall be public records, but the seal of a deputy recorder shall not be attached to any paper except for the purpose of authenticating certificates attached to transcripts of the records in his custody as such deputy recorder.

SEC. 9. Any person who shall willfully and ma-

liciously tear or take down or destroy any notices posted on any claim, or remove or take down any stakes, post or monument placed or erected for the purposes of marking or indicating any mining claim or the line of the vein, ledge or lode, with the intent to destroy or impair the evidences of such location shall be deemed guilty of a misdemeanor, and on conviction thereof before any Justice of the Peace of the county may be punished by fine in any sum not exceeding \$100 or imprisonment in the county jail not exceeding six months, or by both fine and imprisonment.

SEC. 10. An act relating to the discovery of gold and silver quartz lodes and of the manner of their location, approved January 12, 1866; an act supplemental to and amendatory of said act, approved January 14, 1877; an act relating to the recording of quartz claims in Owyhee and Alturas counties, and fixing the fees thereof, approved January 15, 1875; an act relating to the discovery of gold and silver quartz lodes in Lemhi county and the manner of their location, approved January 9, 1877; an act relating to the discovery of gold and silver quartz lodes in Lemhi county and the manner of their location, approved February 21, 1879, and all other acts and parts of acts in conflict or inconsistent with the provisions of this act, are hereby repealed. Approved February 10, 1881.

### News in Brief.

BENJAMIN DISRAELI, Earl of Beaconsfield, died this week.

THERE is great suffering and destitution in many Dakota towns.

POLICE officer Denniston, of this city, committed suicide by poisoning, this week.

PROSPECTORS are hitting out at San Diego for a trip one hundred miles into Mexico.

An insane mother at Camden, Ark., drowned her five children by throwing them down a well.

The first regular train over the Carson and Colorado railroad came through to Bodie on the 18th.

SAN FRANCISCO Chamber of Commerce is discussing bills for prevention of food adulteration.

The doctors and sailors from American ships particularly distinguished themselves in tending the wounded at Seio.

The public schools will close this year on the 27th of May, and the Boye' High school will close one week sooner.

The steamship Oceanic is lying in quarantine in this harbor, small-pox having broken out among the Chinese passengers.

COL. WILLIAM W. GIFT, a well known California pioneer, and noted for his appreciation of fine horses, died this week at Martinez.

THERE are 121 small-pox patients in the New York hospital, an increase for the week of 31. Typhus fever patients, 103, an increase of 47.

THERE is a strike of the plantation hands in St. Bernard Parish, Louisiana. The Governor has been called upon to quiet the disturbance.

MILLER & Lux are shearing 80,000 head of sheep at their ranch at Firebaugh Ferry. They will have the wool graded and ship it direct to Boston.

The manager of the Chestnut-street opera house, Philadelphia, has been instructed to begin a suit against Anna Dickinson for refusing to appear as Claude Melnotte.

It is stated that John Hay, ex-Secretary of State, will take Whitelaw Reid's place as editor of the New York Tribune, for four years from May 1st next. Reid is going to Europe.

NAPA's City Board of Health attempted to build a pest house in the county infirmary lot. Many citizens objected to this, and the building was torn down and scattered along the road.

A NEW ORLEANS dispatch says that the State Board of Health requests the Governor to issue a proclamation establishing quarantine from May 1st against ports infected with yellow fever.

### Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omission of agents.

### Pocket Mining Atlas,

Containing the principal mining districts in the United States. Compiled from the latest official surveys and the most authentic sources by Edwin Bolitho. Sent, post-paid, on receipt of \$1. Address, Dewey & Co., 202 Sansome St. S. F.

PERSONS receiving a sample copy of the MINING AND SCIENTIFIC PRESS with this notice marked, are requested to examine the merits of the same, and consider fairly its claims for support, and if consistent, subscribe for the paper through the P. M. or agent delivering it, or otherwise. We will send it, on trial, at the rate of \$4 per annum for any period the reader may wish. Please notice our terms elsewhere, and if desired, send for further samples and information. Those who can circulate this No. further to our advantage are invited to do so.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

BY TELEPHONE.—Subscribers, advertisers and other patrons of this office can address orders, or make appointments with the proprietors or agents by telephone, as we are connected with the central system in San Francisco.



Our Agents.

Our Agents can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging labors. We intend to send none but worthy men.

J. F. ORSONA—San Francisco.  
A. C. KNOX—Sonoma, Napa, Lake and Mendocino counties.  
J. W. McGRAW—Santa Clara county.  
M. P. OWEN—Santa Cruz County.  
J. W. A. WAIGHT—Merced, Tulare and Kern counties.  
N. E. BOYD—San Bernardino Co.  
JAMES C. HOAG—California.  
B. W. CROWELL—Tehama and Butte counties.  
D. W. KALLANER—Santa Barbara, Ventura and San Luis Obispo counties.  
A. LEONARD MEYER—Utah, Idaho and Montana Ter.

HALL'S VEGETABLE SICILIAN HAIR RENEVER is a scientific combination of some of the most powerful restorative agents in the vegetable kingdom. It restores gray hair to its original color. It makes the scalp white and clean. It cures dandruff and humors, and falling out of the hair. It furnishes the nutritive principle by which the hair is nourished and supported. It makes the hair moist, soft and glossy, and is unsurpassed as a hair dressing. It is the most economical preparation ever offered to the public, as its effects remain a long time, making only an occasional application necessary. It is recommended and used by eminent medical men, and officially endorsed by the State Assayer of Massachusetts. The popularity of Hall's Hair Renever has increased with the test of many years, both in this country and in foreign lands, and it is now known and used in all the civilized countries of the world.

FOR SALE BY ALL DEALERS.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

The State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M., daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

Metals.

[WHOLESALE.]  
WEDNESDAY, April 20, 1881.

<b>IRON —</b>		
American, Pig, soft, ton.....	32 00	@ 33 00
Scotch, Pig, ton.....	28 00	@ 27 00
American White Pig, ton.....	—	@ —
Oregon Pig, ton.....	—	@ —
Refined Bar.....	41 @	8
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ 94
Norway, according to thickness.....	84 @	95
<b>STEEL —</b>		
English Cast, lb.....	16 @	18
Black Diamond, ordinary sizes.....	13 @	15
Drill.....	9 @	10
Flat Bar.....	—	@ 22
Plow Steel.....	9 @	10
<b>COPPER —</b>		
Ingot.....	—	@ 52
Sheet.....	—	@ 25
Shoeing, Tinned 14x18.....	—	@ 42
Nails.....	—	@ —
Bolts.....	38 @	42
Old.....	—	@ 18
Bar.....	—	@ 22
Precipitate, 100 fine.....	13 @	19
<b>LEAD —</b>		
Pig.....	41 @	5
Bar.....	—	@ 6
Pipe.....	—	@ 8
Pipe, soft.....	—	@ 9
Shot, discount 10% on 560 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Buck.....	—	@ 2 50
Chilled.....	—	@ 2 50
<b>TIN PLATES —</b>		
10x14 I O Charcoal.....	—	@ 10 50
10x14 I C Coke.....	40 00	@ 10 00
Bacon Tin.....	—	@ 25 00
Australian.....	—	@ 20 00
I. C. Charcoal Roofing 14x20.....	—	@ 10 00
20x28.....	20 00	@ 21 00
<b>ZINC —</b>		
By the Cask.....	—	@ 10
Zinc Sheet 7x3 ft. 7 to 10 lb, less the cask....	104 @	11
<b>NAILS —</b>		
Assorted sizes.....	4 00	@ 4 75

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

DIVIDEND NOTICE.

OFFICE OF THE  
Silver King Mining Company,  
SAN FRANCISCO, APRIL 7, 1881.

At a meeting of the Board of Directors of the above named Company, held this day, a Dividend (No. 10) of Twenty-five (25) Cents per share was declared, payable on FRIDAY, April 15th, 1881, at the office of the Company, Room 19, No. 328 Montgomery street, San Francisco, Cal. Transfer books will be closed on April 11, 1881.

JOSEPH NASH, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE  
Eureka Consolidated Mining Company.

Nevada Block, Room No. 37, San Francisco, April Fifteenth (15), 1881. At a meeting of the Board of the Directors of the above named Company, held this day, a Dividend, No. Sixty-six (66) of Fifty (50) Cents per share was declared, payable on Wednesday, April Twentieth (20), 1881. Transfer books closed until the Twenty-First (21) instant.

P. JACOBUS, Sec'y pro. tem.

REGULAR DIVIDEND NOTICE.

OFFICE OF  
Northern Belle Mill and Mining Company.

SAN FRANCISCO, CAL., APRIL 9TH, 1881.  
At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 42), of Fifty (50) Cents per share, was declared, payable on FRIDAY, April 15, 1881. Transfer books closed on Monday, April 11, 1881, at 3 o'clock, P. M.

WM. WILLIS, Secretary.

Office—Room No. 29 Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

EXTRA DIVIDEND NOTICE.

OFFICE OF  
Northern Belle Mill and Mining Company.

SAN FRANCISCO, CAL., APRIL 9, 1881.  
At a meeting of the Board of Directors of the above-named Company, held this day, an Extra Dividend (No. 43), of Twenty-five (25) Cents per share, was declared, payable on FRIDAY, April 15, 1881. Transfer books closed on Monday, April 11, 1881, at 3 o'clock P. M.

WM. WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

Lewis Consolidated Silver Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Twenty-third (23) day of March, 1881, an assessment, No. Four (4) of Six (6) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. Gold Coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Second (2) day of May, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Twenty-third day of May, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. PEW, Sec'y.

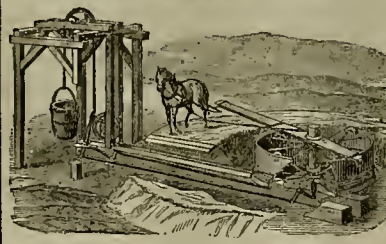
Office, No. 310 Pine Street, Room 15, San Francisco, Cal.

INCERSOLL

ECLIPSE ROCK DRILLS.



The Most Economical Air Compressors in the Market.



MINERS' HORSE-POWER.

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to hot timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

REYNOLDS & RIX,  
49 Fremont St., S. F.

BUY LAND

Where you can get a crop every year; where you will make something every season; where you are sure of having a crop when prices are high; where you have a healthy place to live; where you can raise semi-tropical as well as other fruits; where you can raise a diversity of grain and vegetables and get a good price for them. Go and see the old Reading Grant (in the upper Sacramento Valley), and you will find such land for sale in sub-divisions to suit purchasers—at reasonable rates and on easy terms. Send stamp for map and circular to EDWARD FRISBIE, proprietor, (on the Grant), Anderson, Shasta Co., Cal.

DUNHAM, CARRIGAN & CO.,

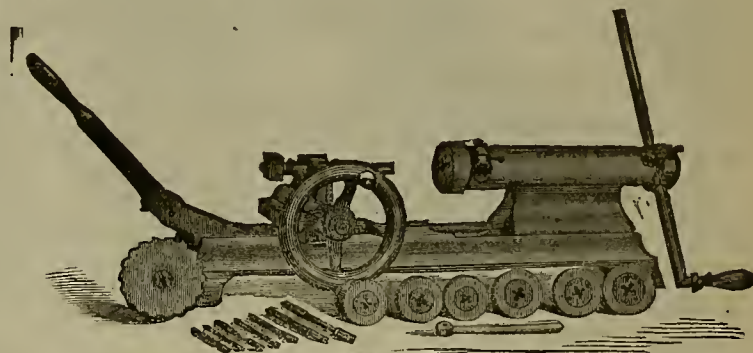
LIGHTNING SCREW PLATES



WITH TAPS, DIES AND COLLETS COMPLETE.

B, Stock 23 inches long, 7 Taps and Dies Cuts  $\frac{1}{4}$  to  $\frac{3}{4}$  inch.  
C, " 26 " " 7 " " "  $\frac{3}{8}$  to 1 "  
D, " 53 " " 6 " " "  $\frac{1}{2}$  to  $1\frac{1}{2}$  "

No. 10. Lightning Hand Bolt Cutters and Tappers.



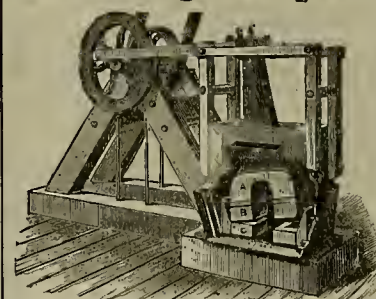
ESPECIALLY FOR CROOKED WORK!

Made to be holted to the Bench or Table. Fitted with seven sizes, from  $\frac{1}{4}$  to  $\frac{3}{4}$  inch. Usual assortment,  $\frac{1}{4}$ , 5-16,  $\frac{3}{8}$ , 7-16,  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$  inch.

SEND FOR CIRCULARS, COMPLETE.

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HUNTINGTON'S  
Oscillating Stamp Mill



It has no Stems, Cams, or Tappets, and Adjusts itself to the Wear of the Shoes and Dies.

For Simplicity, Economy, Durability and Effective Working, it exceeds anything ever presented to the public, and will do the work of five stamps with one-fourth the power.

Price, 900-Pound Hammer, - - - \$500.  
Double Mills, - - - \$950.  
Price, 1200-Pound Hammer, - - - \$600.  
Double Mills, - - - \$1150.

Send for Circulars and Testimonials.

SHOULE MACHINES AND SAW MILL MACHINERY, STEAM ENGINES, ETC., TO ORDER. MINING MACHINERY OF ALL KINDS.

F. A. HUNTINGTON,  
220 Fremont Street, San Francisco.

N. W. SPAULDING'S



PATENT DETACHABLE TOOTH SAWS,

Manufactory, 17 & 19 Fremont St., S. F.



A NEW TREATMENT

Consumption, Asthma, Bronchitis, Dyspepsia, Catarrh, Headache, Neuralgia, Debility, Rheumatism, And all CHRONIC and NERVOUS DISEASES.

PACKAGE CONVENIENTLY SENT BY EXPRESS, READY FOR USE

AT HOME.

A Treatise on Compound Oxygen, giving the history of this new discovery, and a large record of most remarkable cures, will be mailed free to all who ask for it. Also, "Health and Life," a quarterly journal, containing much interesting information. Write for it. Address the proprietors, DR. STARKEY & PALEN, 1109 and 1111 Girard street, Philadelphia, Pa., or H. E. MATHEWS, 606 Montgomery street, San Francisco, Cal., from whom can be procured both information and supplies.

Mining & Scientific Press  
Patent Agency.

THE MINING AND SCIENTIFIC PRESS PATENT AGENCY was established in 1860—the first west of the Rocky Mountains. It has kept step with the rapid march of mechanical improvements. The records in its archives, its constantly increasing library, the accumulation of information of special importance to our home inventors, and the experience of its proprietors in an extensive and long continued personal practice in patent business, affords them combined advantages greater than any other agents can possibly offer to Pacific Coast inventors. Circulars of advice free. Address, DEWEY & CO., Office MINING AND SCIENTIFIC PRESS, 202 Sansome Street, S. F.—1881.

AN ASSAYER and CHEMIST

Who acquired his knowledge at first-class Universities of Europe desires a position. The same is supplied with a complete outfit. Please address, A. B., this office.



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### SACRAMENTO BOILER WORKS,

214 &amp; 216 BEALE St. (rear of Etna Foundry).

J. V. HALL,

PRACTICAL BOILER MAKER.

Marine, Stationary and Portable Boilers, Smoke Stacks  
Hydraulic Pipe, Oil or Water Tanks, Ore and  
Water Buckets, Gasometers, Girders,  
Bridges and Iron Ship Building.

### ALL KINDS OF SHEET IRON WORK,

Repairing promptly attended to at the lowest  
possible terms.

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON &amp; CO.,

MANUFACTURERS OF

### STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

### Golden State & Miners Iron Works,

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard &amp; Folsom, S. F.

### California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt  
Metal Castings, Brass Ship Work of all kinds, Spikes,  
sheathing Nails, Rudder Braces, Hinges, Ship and Steam-  
boat Bells and Gongs of superior tone. All kinds of Cocks  
and Valves, Hydraulic Pipes and Nozzles, and Hose Coup-  
plings and Connections of all sizes and patterns, furnished  
with dispatch. PRICES MODERATE.  
J. H. WEED. V. KINOWELL.

### California Machine Works,

WM. H. BIRCH, Prop'r.

119 Beale Street, San Francisco.

General Mechanical Engineer and Machinist.  
Steam Engines, Flour, Quartz and Mining Machinery.  
Sole manufacturer of Brodie's Patent Rock Crushers and  
Steel Faced Tapirs. Agent and Manufacturer of F.  
A. Young's Patent Steam Packing Rings for Steam Pistons.  
The best ever invented; can be applied to any Engine  
Piston and give entire satisfaction to those using. Steam,  
Hydraulic and Sidewalk Elevators. Repairing promptly at-  
tended to.

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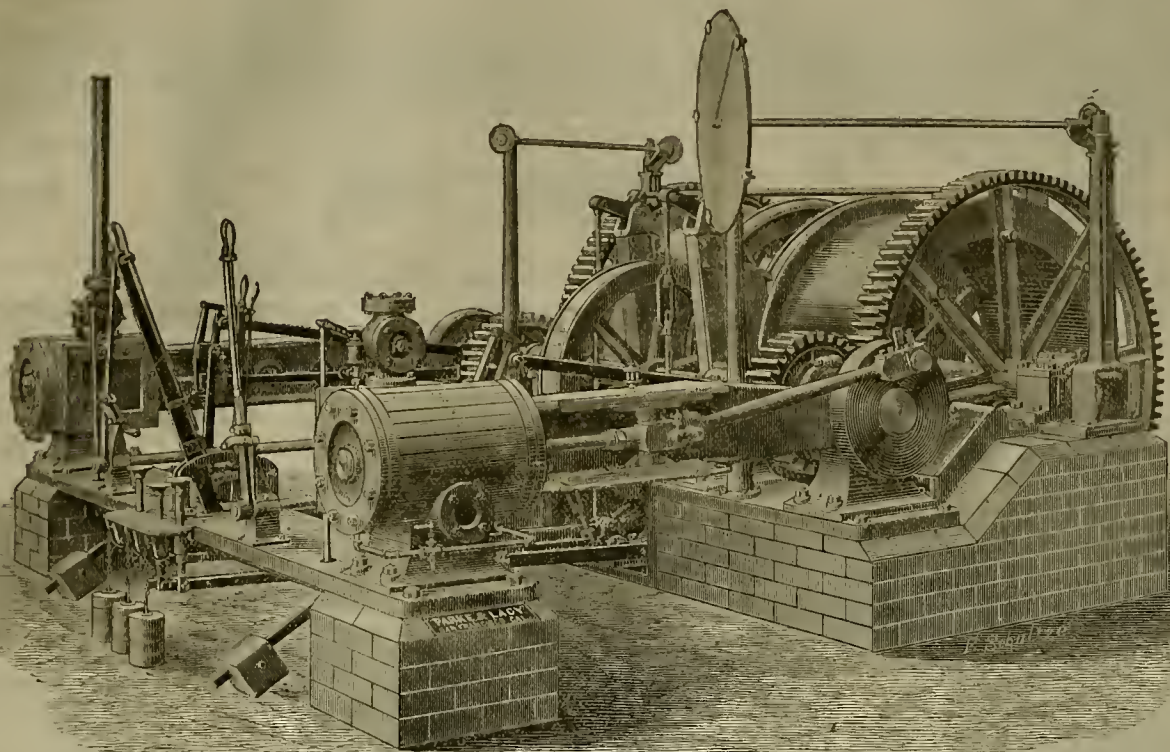


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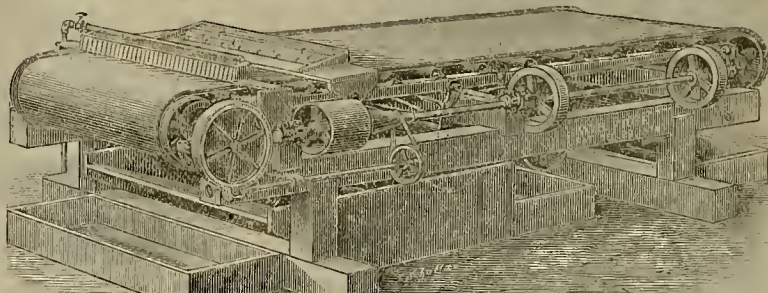
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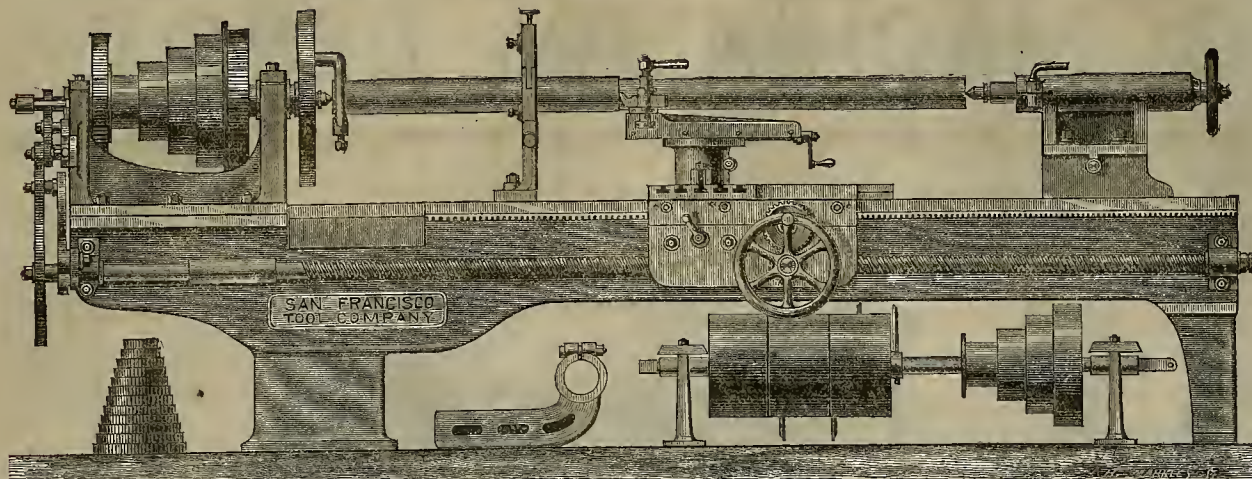
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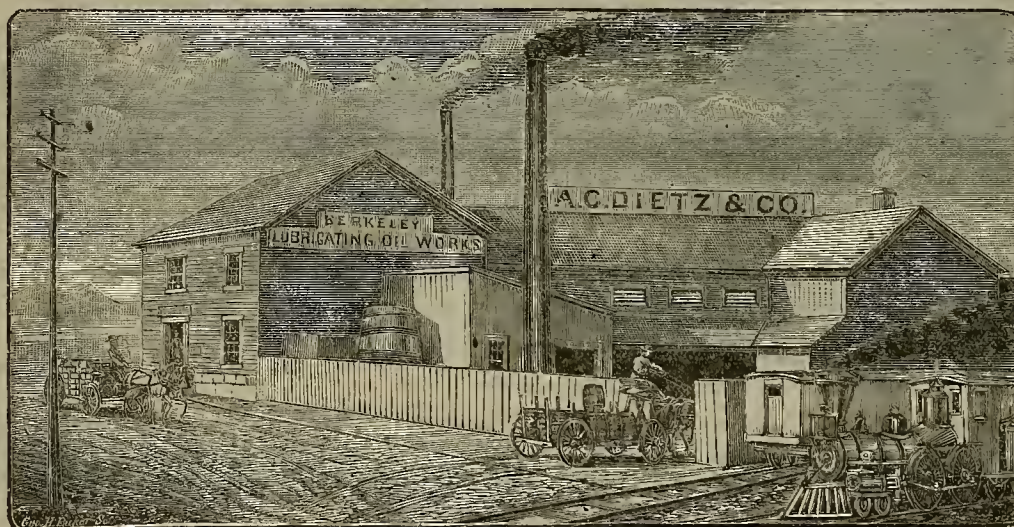


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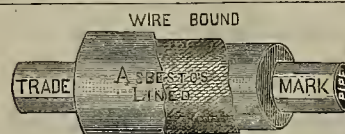
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SAN FRANCISCO, SATURDAY, APRIL 30, 1881.

VOLUME XLII  
Number 18.

## The O'Harra Chloridizing Furnace.

We illustrate on this page the O'Harra chloridizing furnace, a metallurgical appliance, now for some time in use on this coast, and which has given satisfaction, judging by the testimonials of those who have used it. The furnace costs from \$4,500 to \$6,000 according to size of from 40 to 60 tons capacity per day. We have prepared the following very complete description of the furnace in detail, and with the aid of the engravings, the construction and operation can be readily understood.

This furnace is constructed of the usual materials, and is made with two separate hearths, one for desulphurizing and the other for chloridizing the ore, both processes being performed at the one operation. The lower hearth is a perfect plane, and is separated from the upper hearth, also a plane, by the longitudinal diaphragm, or division, which forms the roof of the lower furnace and the floor of the upper one.

At the end of the furnace, where the ore is fed and discharged, is a grooved pulley, mounted on a shaft, to which power may be applied, as shown. At the other end of the furnace is built an extension or frame-work, at the outer end of which is another pulley. Around these pulleys passes an endless chain, which passes completely through the furnace, going one way through the upper compartment and the other way through the lower as the grooved pulley is rotated on its shaft by the steam engine.

The pulleys carrying the endless chain move from left to right, so that the scrapers or conveyers on the chain move over the upper hearth from the opening through which the ore is fed, and then back through the lower compartment, thus admitting of the ore being fed and discharged at the same end of the furnace.

Attached to this endless chain, at proper distances apart, are conveyers or scrapers, formed into a triangular shape. To the front bars of this triangle are fastened a number of hoes or stirrers, at such an angle that they will push the ore on the hearths from the center to the sides. On the next triangular scraper the hoes are set in an opposite direction, that they will scrape the ore from the outer part of the hearth to the center.

The hoes or plates in each alternate scraper are set at opposite angles, so that one set of plates covers up the furrows made by the previous set, thus keeping the ore continually stirred, so that all portions are subjected to the action of the heat and the chloridizing substances, and so that it may be thoroughly desulphurized and chloridized as it passes through the furnace. As each scraper with its set of plates or hoes passes through, it moves the ore ahead, somewhat at the same time that it stirs it over.

In the center of the extension frame, between the center portions of the frame work, are the pulleys or sheaves which take the weight of the endless chain as it passes out of the furnace. On the outer ends of the two shafts carrying the pulleys on which the endless chain revolves, are two pulleys, over which the scrapers carrying the plates pass. The peculiar triangular shape of these scrapers or conveyers admit of their passing over the pulleys without difficulty.

In the center of both upper and lower hearth is a longitudinal groove, into which the endless chain may be dropped when the machinery of the furnace is stopped. In order to accomplish this, the shaft carrying the pulley on the extension is mounted on a carriage which admits of a forward and backward motion.

When the furnace is in operation, the carriage carrying the shaft on which the pulley is mounted, is slid to the outer end of the frame or extension and secured so as to tighten the chain. As the chain then passes in and out of the furnace in its rotation it becomes alternately heated and cooled, and it is not injured by the heat and sulphurous fumes.

When, however, the machinery is stopped while the furnace is still hot, that part of the chain within the furnace would be injured by the action of the heat and gases. By sliding the carriage carrying the shaft and pulley back toward the furnace the chain is slackened and

drops into the grooves in the hearth out of the way. At either end of both upper and lower hearths is hinged a door, having a groove at its lower edge, through which the chain passes. As each conveyer comes to the door it pushes the door up on its hinges out of the way, and when it has passed in the door drops to its seat again, the groove in the bottom allowing the chain to pass on. This door is intended to prevent there being too much open space at the

with its natural tendency to rise, will pass on up into the upper compartment. As soon as this upper compartment is thoroughly heated, the fire-clay damper is pushed in and the fire stopped. The heat from the fire will then pass over the bridge-wall to the lower hearth. After the upper part of the furnace is once heated, or starting up in the manner described, the heat from all the fires is then directed into the lower compartment first, passing up through the open-



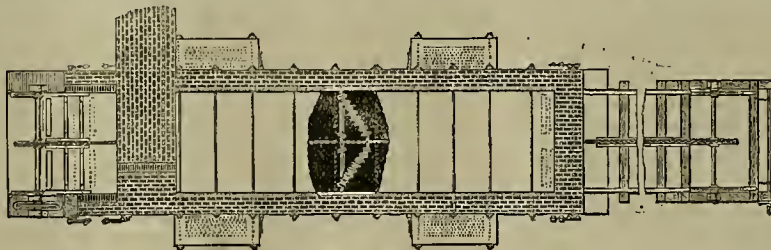
SIDE ELEVATION OF O'HARRA FURNACE.

ends of the compartments, which would affect the draft.

The ore is fed into the hopper and drops into the upper hearth. The action of the plate on the conveyers, actuated by the endless chain, gradually carries the ore along this hearth to the other end of the furnace until it reaches this opening, when it falls through the opening into the lower hearth. Here the conveyers having passed over the pulley on the extension, are carried by the end-

ing to the upper compartment, and thence to the stack.

At each of the fire-places, just under the grates and between them and the ash-floor in the sides of the furnace are a number of small openings, passing through the bridge-wall that separates the fire-places from the hearths. These openings thus connect with the lower compartment and admit a large supply of oxygen to the flame of the fire as it passes from the fire-place over the bridge-wall, thus allowing all the carbon to



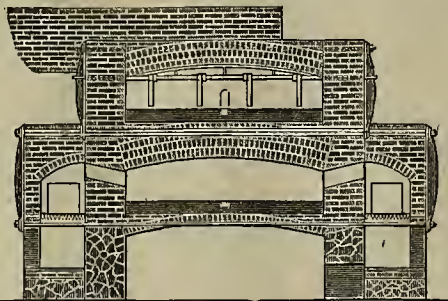
PLAN OF THE O'HARRA FURNACE.

less chain back over the lower hearth to the end of the furnace, where the ore was fed, and by the same action previously described, carry the ore with them.

On the lower hearth, at the front end, is formed another opening, similar to the opening on the upper hearth. The ore is carried along the lower hearth by the action of the conveyers or plates until it reaches the opening, when it drops through the opening into the chamber, from which it may be removed when cooled.

he consumed and giving a better oxidizing flame than could be furnished by other means.

On both sides of the furnace at intervals, are a number of openings into the upper and lower compartments, through which air may be admitted. These openings have doors so arranged as to regulate the size of the opening, so as to admit more or less air or to close the openings entirely if desired. The object of these openings is to admit an additional supply of oxygen to the ore to bring about the chemical changes



END VIEW OF O'HARRA CHLORIDIZING FURNACE.

If considered necessary, the lower hearth may be extended and this opening closed, and the same mechanical means may move the ore along the extension of the hearth in the open air and discharge it perfectly cooled. Four or more fire-places are provided to the furnace, two on each side, and two of them so arranged that the heat may be directed to either the upper or lower compartment, and the other two to discharge the heat to the lower compartment alone, whence it will find its way by means of the opening in the upper hearth to the upper compartment, and thence to the stack. On two of the firing places are placed flues which are connected with the upper compartment, by drawing out the damper. The flame and heat,

necessary to desulphurize the ore. The supply of oxygen thus admitted also tends to increase the heat, so that the furnace consumes its own smoke, and no heat is lost.

On the arch of the upper compartment of the furnace are formed a series of jogs or projections which act as bafflers or obstructions, which intercept the flying particles of ore carried onward by the draft, and precipitate them to the hearth, where they are again mixed with the ore. By this means no particles of ore are carried out by the draft to the stack, for as they fall to the floor from the projections or jogs, the action of the conveyers and plates carries them along with the ore to the discharge opening as before described. The space be-

tween the roof and hearth of each compartment is quite small, so as to confine the heat close to the ore.

The operation of this furnace is as follows: The ore is fed continuously from the battery into the hopper, through which it falls onto the upper hearth. The conveyers and plates or hoes, actuated by the endless chain, as previously described stir the ore on the hearth over and over, keep it from caking or clogging, and gradually push it along over the hearth to the opening, where it falls through to the lower hearth. As the ore is passed along in the upper compartment, it is thoroughly desulphurized by the heat furnished by the fires as described, and by the combustion of the sulphur in the ore. This action is assisted by the oxygen in the supply of air admitted at intervals through the sides of the compartment by means of the openings. For a chloridizing roasting, salt is mixed with the ore as it is fed into the hopper and becomes thoroughly intermingled with it by the stirring action of the plates or hoes. If there is any free silver in the ore, it gets the benefit of the chlorine vapors passing up from the lower hearth.

Now, when the ore falls through the opening and onto the lower hearth, the fall will break up spongy lumps or masses that may have formed, and the ore is again stirred over and over, and carried slowly along through the flame and heat over the lower hearth by the action of the conveyers and plates toward the discharge opening. As the ore is moved along in contact with the fires opening into the lower compartment, the salt gives up its chlorine by the action of the sulphurous gases rising from the decomposing metallic sulphates which have been generated, which action converts the metallic sulphate into chlorides with the simultaneous production of sulphate of soda.

The process is essentially the same as the well-known Freiberg process; but the mechanical devices applied to the furnace and the peculiarity of its construction enable the inventor to thoroughly desulphurize and chloridize the ore to a higher percentage than other furnaces, and with less cost for fuel and labor. When the desulphurization has been accomplished and sulphuric acid ceases to be formed, with the old method, it has been necessary to increase the fires to complete the finishing calcination by decomposing the salt, so that the chlorine evolved will transform the metallic sulphates into chlorides.

By this method, no increase of fires is necessary. The construction of the furnace is such that the heat is greatest just where it is needed—viz., at the point where the ore has been desulphurized—and when it is ready to receive the chlorine from the decomposing salt, in order to be thoroughly chloridized.

The ore, while on the upper hearth, is freed from its sulphur by the combustion of that substance by the heat afforded by the fires, and the combustion of the sulphur is assisted by the supply of oxygen admitted through the side openings, as described, which supply may be regulated so as to suit a class of ore more or less highly sulphureted. During all this time a certain amount of chlorine vapor is rising from the lower compartment and assisting in transforming any metallic silver into a chloride.

By the time the ore drops onto the lower hearth the metals have become sulphates, and here more heat is required, in order that these sulphates may decompose the salt, by the sulphur being liberated and uniting with the oxygen and hydrogen, forming sulphuric acid, which unites with the sodium and forms sulphate of soda, while the chlorine is set free and converts the metals into chlorides. The ore has become gradually more and more heated in its passage through the upper hearth, and by the time the extra heat is required, as stated, it comes immediately in front of the same fires which have during the whole process furnished the heat. As the ore passes along the lower hearth it reaches the last fire, where the intense heat will effectually cause the chemical changes described to occur, and the ore is dropped from the furnace thoroughly sulphurized and chloridized, having been stirred over and over in its passage through by the hoes, so that every particle of ore has been subjected to the action of the heat and chlorine vapors.

Ordinarily the ore will be from five to ten  
(CONTINUED ON PAGE 284.)



## Copper Smelting—Its History and Processes.—No. 3.

[By HENRY HOSSEY VIVIAN, M. P.]

This only conclusion I could draw from what I saw at Rio Tinto was, that they must have had numerous small furnaces similar to those Eastern furnaces I have been describing, contiguous to the shafts or levels from whence the ores were raised, because the slags cover the deposit for acres in extent, and show no signs of having been driven from any one central spot, so far, that is, as my limited means of observation went. I conclude that they must have used very low blast furnaces, somewhat like the "Castilian furnace" of the present day, or possibly like the "Scotch hearth" of Northumberland, which is still extensively used for smelting lead ore, and which is little more than an ordinary blacksmith's hearth; such a furnace would probably be less likely than any other form of blast furnace to produce "Eisensamen," or "metallic pigs." It is also probable that they

Roasted the Ore and Regulus in Heaps. Because the Spaniards do so at the present day, and have done so from time immemorial, for the purpose of rendering a portion of the copper soluble, and thus obtaining it by lixiviation and subsequent precipitation by iron. It is by this process that the present great copper production of Rio Tinto, Tharsis, and Mason & Co. is effected; but in Roman times, it is plain that the rich ores alone were worked, and that the copper was obtained by smelting; otherwise, the enormous masses of slags which we see could have had no existence. I am confirmed in this belief as to Roman copper smelting by the process adopted at the Ocker Hütte, in the Hartz mountains, where ore of a similar character to Spanish pyrites is produced from the great Rammelsburg mine, which is said to have been continuously worked from times quite as remote as the Roman era. That ore is a pyrite rich in iron and sulphur, but poor in copper. It is, or was up to a recent date, hurled in heaps, and then smelted in low blast furnaces, so low that the ore is charged from the floor of the works, no stage being used, as is usually the case in blast furnaces; the resulting regulus is, or was, burnt again and again in heaps, and again and again melted in low furnaces. I believe little or no change took place in the process of copper smelting at the Ocker Hütte from the remotest times up to the date of which I am speaking, some 35 years ago, and that we have there a relic of the practice of those bygone ages; by no means a bad one for the class of ores and fuel they had to deal with.

No doubt the Romans obtained their

### Supplies of Copper

From various sources besides Spain. There appears to be little evidence as to the working of copper mines by the Romans in England. Dr. Percy, however, quotes M. Albert Way and Mr. Franks, two eminent archaeologists, as having informed him that lumps of metallic copper, more or less rounded, have been discovered in different parts of the country, but always in association with articles of bronze. He examined one of these, and found it to be practically pure copper. He also says that Pennant describes a cake of copper found at Caernarvon, or Caer-hen, the ancient "Conovium," near Conway; it weighed 42 lbs., and resembled a cake of beeswax; the diameter at the widest part was 11 inches, and the thickness 2½ inches. On the upper surface was a deep concave impression, with the words "Socio Romæ," and across them the word "Natsol." This would seem to indicate that a Roman co-partnership existed, and that the partners received their dividends in kind. Dr. Percy supposes that the copper came from ores raised at Llandudno, which were smelted *in situ*. This, I believe, is almost a solitary instance of Roman copper in England, although they had abundance of bronze; but whether imported or produced here, we know not.

What happened in the dark period which followed the withdrawal of the Romans from Britain, I am unable to say, nor do I believe that any authentic record exists. We must remember the condition of England at that time. Hume thus describes it: "The private and public edifices of the Britons were reduced to ashes; the priests (Christian priests) were slaughtered on the altars by those idolatrous ravagers; the bishops and nobility shared the fate of the vulgar; the people, flying to the mountains and deserts, were intercepted and butchered in heaps; some were glad to accept of life and servitude under their victors; others, deserting their native country, took shelter in the province of Armorica, where, being charitably received by a people of the same language and manners, they settled in great numbers, and gave the country the name of Brittany." Hume quotes from Bede, Usher and Gildas to support his assertions. We must remember that the period which succeeded the withdrawal of the Romans was one of almost constant warfare. It is not until the time of Elizabeth that I can give any reliable account of what took place in England so far as copper is concerned. Dr. Percy mentions that Edward III., in the 15th year of his reign, granted the right of working the copper mines of Skildane, in Northumberland, and the copper mines of Alston Moor, in Cumberland, and the copper mine near Richmond, in Yorkshire, on payment of a royalty of one-eighth to himself, and one-ninth to the lord of the soil, to a company of adventurers, among whom was his brother Richard, Duke of Gloucester, and Henry, Earl of Northumberland. In the reign

of Elizabeth, there was a rich copper mine at Keswick, in Cumberland, of which that queen deprived the Duke of Northumberland on the ground that it was a mine royal. It was reported that 4,000 men were employed at that mine, but this is probably a great exaggeration. According to Camden, much good copper continued for a long time to be made at Keswick and Nawland; but Webster, in 1671, wrote that now "the work is quite left and decayed, yet I am informed that some do now melt forth as much good copper as serveth them to make half-pennies and farthings." I beg especially to direct your attention to this smelting at Keswick, in Cumberland, because I think there is no doubt from the records brought to light by the laborious and intelligent researches of our fellow-townsmen, Lieut.-Col. G. Grant Francis, that the first smelting works in South Wales was built and worked by men from Keswick. I am very glad indeed to hear testimony to the great interest and value which attaches to Col. Francis's work, of which I am about to avail myself to give you a short account of how copper smelting began in this district. I allude, of course, to the work published by Col. Francis in 1867.\* It is not my purpose to give the history of copper smelting down to the present day; those who desire to go into the details of that history will find them fully set forth in Col. Francis's admirable work; but what I desire to do is, so far as I am able, to trace the history of the process known as the South Welsh process of copper smelting, which really now is the dominant process of the world. I remember well that Col. Francis announced to me before he published his letters in 1867, that he had discovered that our Welsh copper smelting

### Process Came from Germany.

I at once told him, and I still retain that opinion, that such could not be the case, inasmuch as nothing analogous to it existed in any part of Germany even down to our time. I think we were both in part right. The evidence Col. Francis has discovered puts it beyond a doubt that Germans were largely engaged in the Keswick smelting; but there is no title of evidence that I can discover that they brought our reverberatory process with them from Germany. In point of date, the story begins with a patent granted by Queen Elizabeth, in 1564 (page 29), to Thomas Thurland, Jr., of the Savoy, and Daniell Hogstetter, a German, giving them "power and authority to search, dig, try, roast and melt all manner of mines and ores of gold, silver, copper and quicksilver in York, Lancaster, Cumberland, Westmoreland, Cornwall, Devon, Gloucester and Worcester, and the principalities of Wales, as well within her Majesty's own grounds as others, on payment of a royalty." In the same year, a patent was granted "to William Humphrey, and Christopher Shutes, a German, with similar powers within England, and the English pale in Ireland, except the places afore granted." Under the first of these patents, no doubt, the working and smelting at Keswick was carried on. Seventeen years later, in 1581, we find a letter from Mr. George Nedham, to Sir Francis Walsingham, setting forth in considerable detail the operations which were carried on under the direction of one Jochim Gause, Ganse, or Gans, for his name is spelt in these three ways. This letter is of a most interesting character, and contains, I believe, distinct indications of the

### First Introduction of the System

Of copper smelting which has been ever since that date so largely practiced in this district, and which is now more or less adopted in almost every important copper-producing district of the world. I gather from this letter that the Keswick Works were managed by Mr. Daniell (possibly the Mr. Daniell referred to was Mr. Daniell Hogstetter) and Mr. Stemberger up to 1581, when Mr. Jochim Gans went there; that their practice had been to roast and smelt the ore and regulus repeatedly; as many as 16 and even 22 fires are mentioned; half of these were roastings and half meltings, and the time occupied was as many weeks as fires. It is pretty certain that the roasting was done in heaps; for by no means can I conceive it possible to roast and melt so many times without producing copper. Nedham says (Par. 3, page 20): "And further, the said Jochim doubteth not but after he hath roasted and smolten 3, or 4 saies of o'r copper ure in the great worke, after such manner as he hath devised since his coming from Keswick, to attaine to such further knowledge of the nature of all o'r coppse ures in Cumberland and Westmoreland, that he shall be able to kill all corrupt humours in them and thereby to bring out more copper than heretofore hath byn and with lesser charge than is above written."

\*"The Smelting of Copper in the Swansea District, from the Time of Elizabeth to the Present Day." By Major Grant Francis. Not published. 1867. 8vo, 120 pages. (Only 50 copies printed.) For announcement of the Second Edition, see *Engineering and Mining Journal*, February 5, 1881, p. 95.

(To Be Continued.)

THE TUCSON, A. T., *Citizen* says that the antimony mines are the boom of Sonora. Ore of that kind in such quantities has not been recorded in the known world. About 300 tons taken from a shaft 70 ft. in depth on the Santa Margarita contains over 70% antimony and at least \$200 per ton silver.

THE March product of the Deadwood-Terra mine is given at \$75,000, and of the Homestake \$103,000.

COPPER CITY, Shasta county, has shipped \$6,326 since April 1st.

## The Cost of Amalgamating Ores in Utah and Nevada.—No. 1.

[Read before the American Institute of Mining Engineers by R. P. ROTHWELL, M. E., New York City.]

The milling of silver ores has arrived at a great degree of perfection in the mining districts of our Western States and Territories; and I have thought the record of the practical results obtained at the present time, in a few of the principal districts, would prove of value and interest to many of our members, both at home and abroad.

1. An American silver mill is composed, in descending order from where the ore is dumped, of a rock breaker, usually of the Blake or Alden pattern; 2. The battery of stamps, the number of which varies from 5 to 120, generally in batteries of 5 or 10 heads, so arranged that a single battery may stand while the others are running; 3. The tanks where the crushed ore settles (if it be a wet stamping mill), or of a drying floor if the crushing be done dry; 4. Amalgamating pans; 5. Settling pans; 6. Agitators or pans in which mercury escaping in the tailings is caught; 7. Blanket sluices, over which the tailings run, and where mercury and unamalgamated sulphides are saved.

### The Ontario, Utah, Silver Mill.

One of the best examples of a silver mill, and at the same time one of the most successful concerns in the West, is the mill of the Ontario Silver mining company, near Salt Lake, in Utah. This mill treats the ore from the Ontario mine, ore which at present is very base, being composed of zinc, lead and silver sulphides and silver chloride in a quartz gangue. This ore has become baser as the mine attained greater depth, though the vein holds its own, or rather increases, both in thickness and richness. The mill is managed in a skillful and economical manner, though the necessity for roasting the pulverized ores in Stetefeldt furnaces necessarily makes the cost of milling much greater than in the case of such free milling ores as those of the Comstock mines, and especially than those unrivaled free milling ores of the silver-bearing sandstone district of Silver Reef, in southern Utah.

I will here summarize briefly the various operations through which the ore goes in the Ontario mill, giving at the same time the number of men employed in each part of the work, and the wages they receive, as well as the quantity of chemicals used. For this data I am indebted to the courtesy of the very efficient general manager of the Ontario company, Mr. J. C. Chambers, and to the skillful young superintendent of the Ontario mill, Mr. J. E. Gallagher.

The mill is charged with the hauling of the ore from the mine to the mill, which costs by contract 50 cents per ton dry. The moisture averages about 11%. The distance is about a mile, and down grade all the way, four-horse teams hauling six to seven tons at a load. The ore, which is weighed by one weigher at \$4 a day, is delivered on the ore floor screened, by passing over iron bars 2" x 3" x 9' long, with spaces of two inches between; the inclination of the bars is about 30°. The coarse ore goes through two Blake crushers, attended by one man at \$2.50 per day, and is crushed to the size of a pigeon's egg, and then goes along with the fine ore which has passed between the screen bars through shoots to the drying floor, which is heated by 13 flues, seven of which are heated by auxiliary fires and six by the waste gases from the Stetefeldt furnaces and one auxiliary fire. It was at first supposed that the waste gases from these roasting furnaces would have sufficed for the drying floor, but experience has shown that they do not. From the shoot the ore is carried over the drying floor in cars, which carry 1,000 lbs. of ore (dry), and from this measure the quantity of salt is gauged. The ore is spread over the floor to a depth of three inches, and, after drying for two hours, 1½% wet (about 15% dry) of salt is scattered over the ore. The salt used is evaporated from the waters of Salt Lake, and costs at the Ontario mill about \$7 per ton, \$5.50 of this being for hauling from the salines to the mill. The ore is left from one and a half to two hours after the addition of the salt for the purpose of drying the same, and is then turned with shovels. This work is very injurious to the men, who quickly get swelling of the legs, it is supposed from arsenic in the ore, and in this, as in most other trying occupations, it is found that indulgence in alcoholic stimulants quickly incapacitates the workmen. Three men on a shift and three shifts a day, with wages at \$3.50 per day, are required for the work on the drying floor. After turning, the ore and salt remains on the floor for from one-half to one and a half hours, and is then scraped off by a mechanical scraper to the self-feeder of the battery.

The battery consists of 40 800-lb. stamps, which drop 8 to 8½ inches 92 times per minute. The shoes, dies and tappets are of steel, cast in Collinsville, near Hartford, Conn. The dies and shoes wear from two to six and sometimes eight months; the tappets and cams last 12 months. The cams weigh about 250 lbs., and the iron stamp stems are 3½ inches diameter and 14 ft. long. The stamp screens are of brass wire, No. 30, that is, 900 meshes in a square inch. Formerly a No. 50 screen was used, but as the ore became more base it would not splash high enough on the screen, and the amount it was possible to mill dry became greatly reduced. Mr. Gallagher tried the larger mesh screens with great success, it being found that the roasting and chlorination in the Stetefeldt furnaces

is quite as perfect, if not more so, on the coarse ore as on the fine. The battery requires the attendance of one man each shift; wages \$4, and three shifts a day. This crushed ore is conveyed from the battery by a screw shaft, working in a box parallel with the battery to a common flour-mill elevator, (with Russia-iron cups 22 inches apart, on a rubber belt 6 inches wide, and which lasts two years). This raises it to a vertical height of about 50 ft., to the pockets over the Stetefeldt furnaces; thence it passes through two screens, the bottom one of which is fixed, and stands on the top of the water-jacket, and the upper one vibrates, making about 50 strokes per minute. It is run by cone pulleys, and over the vibratory screen are four brass bars called "agitators," which keep the ore moving on the screen. The screens are of No. 18 steel plate, punched with 10 holes to the inch, and the ore sifts down through them into the furnace. This is 46" 6" high, and from the bottom the ore is drawn every three-quarters of an hour. One man on a shift (wages \$4), and three shifts a day, is all the labor required at the screens. This man takes samples for assay every hour.

(To Be Continued.)

## Railside Horticulture.

The Central and Southern Pacific railways have done a good thing for the State by their system of tree planting beside their tracks. We have been pleased also to see here and there a switch-tender so imbued with the love of the beautiful that he has embowered his little cabin with a fine growth of vines and surrounded it with miniature flower beds. There is also a disposition in some towns to beautify the surroundings of the railway stations. The Dwight-way station, in Berkeley, is enclosed in a pretty little park, arranged under the auspices of the Berkeley Neighborhood Improvement Society. There is room for much more good work of this kind all over the State, for many stations are unsightly places; as inhospitable and bare as neglect can make them. This is exceedingly unfortunate, for many reasons, and should be changed. First impressions are very strong with many persons and if one is met at the station, when descending from the car steps, with a view of desolation and unthrift, it may take many miles of flower gardens afterward to win a good opinion of the town. If the stations were made over into little oases of shrubs and trees the effect would be quite different. Each village and town should have a pride in a work of this kind. It would be comparatively easy if the people would interest themselves in it. We are of the opinion that the railway company would furnish most of the trees and shrubs, and then all that the people need do is to see that they are kept in condition fit for growth. There is no telling how wide reaching the influence of such improvements might be. It is quite possible that the picnic character of the surroundings would impel the station loafers to indulge in an occasional clean shirt, and the agent might tread the platform with polished boots. Even such great changes as these are quite within the possibilities.

Railside and station horticulture is not at all a new idea. It is practiced quite generally in the older States and abroad. The *New York Tribune* recently noted facts in this connection, stating that there are some pleasing examples of railway gardening in Maine. In Pennsylvania many of the station areas are brightened by the smiling beauty of flowers and the graces of foliage. In Europe, where there are more people with less to do, and where the shorter lines of roadways of all sorts can be kept on that account, in garden trim, it is common to see every little country station, however lonely and retired, beds of bright flowers edging the walls and shining in the windows. All stations are inclosed there; the gates being opened from the gatekeeper's lodge for every passing vehicle. Here, each planted area has necessarily its own fence, all around being entirely open. The cuttings near Paris are planted all over the slopes with American locusts.

As we have hinted before, California has already some good examples of what we would make prominent. There are also some beautiful spots along the dreary overland route through Nevada. We would have a thousand times as much of it. Which town in California will have the prettiest station? It is time now to plan and next fall to plant.

HORSESHOE BASIN DISTRICT dry placers are 65 miles west of Tucson, A. T., and remarkable results are reported. B. W. Connelley, an old California miner, is one of the prominent men there.

The dividend of the Ontario mining company paid in New York on the 15th, was on the new shares (150,000), and the amount was, therefore, \$75,000.

LOTS OF WATER.—There are 3,468,000 gallons of water flowing from the mouth of the Suto Tunnel every 24 hours. The temperature of this water is 119°.

THE March product of the Ontario mine is officially reported at \$230,238. The dividend paid at New York last Friday was the 66th, and the grand total is \$3,350,000.

RICH copper has been found on the upper Yellowstone river.



# MECHANICAL PROGRESS.

## A Scientific Railway Car.

Mr. P. H. Dudley, a railway inspector, has devised a special apparatus, which he has permanently attached to a railway car, and by which he is enabled to take an automatic diagram of the road over which his car passes. His apparatus is of a most delicate and complicated nature, and the amount and character of work done by it is simply marvelous. A description of it would be wearisome, with its systems of cog, switches, wires, pens, etc., and it would be almost unintelligible, but an idea of its extraordinary work may be gained from the following summary of its accomplishments, as given by the Pittsfield (Mass.), *Sun*:

A band of plain paper, about 20 inches wide, is fed from a roll into the machine, passing under a complex set of overflowing pens. For every 50 ft. of track passed over by the car this paper moves one inch, thereby taking eight and a fraction ft. for a mile of road. By carefully constructed and adjusted machinery, connected with the wheels of the car, the operator obtains upon the paper a perfect chart of every foot, yes, every inch, of the road. The instrument shows: first, the power required to draw the train; second, a pen marks on the paper the seconds of time in transit; third, another pen marks every tenth second in the same way; fourth, still another pen marks each minute. Then comes a schedule showing the distribution of coal used by the engine; the amount of water used by the engine; a perfect diagram of the track is delineated, showing all curves, grades, etc.; the number of revolutions which the driving wheels of the engine make in a minute or mile, or parts of these two; the location of the mile posts are shown, and also the bridges; the work done by the engine, so given that the foot-pounds of work can be readily ascertained by multiplying the ratios; the velocity and resistance of the wind. All these are plainly and accurately shown upon the diagram. When used to inspect the track, the machine shows the surface of each rail, giving the condition of each joint, frog, etc., and shows at a glance whether the rails are fitted perfectly true, or the least trifle out of place, or if one is a hair's breadth higher than another.

The elevation of the rail on a curve is shown, and a machine has just been added, which Mr. Dudley invented, given the exact amount in feet and inches that the rails are depressed from a true line. Another section of the chart gives the exact movements of the engineer when the brakes are applied, when steam is put on, and the power required to start and stop the train. Mr. Dudley examines a road in this way, hands his chart to the superintendent, and that gentleman knows at once just where to make repairs and all other needful particulars. Mr. Dudley spent eight years perfecting his machine, and, save one which he made and sent to Australia, his is the only one in existence.

Besides his work-room there are a nicely furnished library and parlor, containing cabinets and a fine piano, a dining-room, kitchen, bedroom and store-room. All this in a common size passenger coach, and in it Mr. and Mrs. Dudley have lived for the last four years, traveling all over the United States. The lady says the life is a very pleasing one, and she enjoys it much. Both the lady and gentleman are kindly educated and entertaining people, and an hour spent in their company is a very profitable one.

**MECHANICAL QUACKS.**—No trade is so pestered with quacks, hatches and pretenders as that of the carpenter and joiner's. Go where you may, the ubiquitous botch, with his brier-root saw, hattersed jack-plane and defective square, is on hand, ready to undertake the designing and erection of a back fence or State court house. Gifted with a mind that rises above the ordinary concerns of life, he looks with contempt on the man who has "fooled" his time away learning a trade, or who fritters away his employer's substance by making good joints and lasting work. It makes no difference to him what kind of a building you may have to erect, he is always ready, willing and able to do it, and can make the price to suit. Tell him how much money you wish to expend, and the size, style and character of building you want, and you will find him equal to the difficult task of making one fit the other. He is full of promises and will guarantee all kinds of good things if you will only let him have the contract. When the work is completed—according to his idea of completeness—if it stands to be completed, you are astonished, though not charmed, at the "emphasis" of the joints and peculiar, hear-skin like finish of the work. The quarreling, the profanity, the law suits, suicides and murders that follow, are interesting, romantic and delightful in the extreme; but amid all this, the "botch" never loses his equanimity. —*Builder and Woodworker.*

**HARDENING SMALL TOOLS.**—It is said that the engravers and watchmakers of Germany harden their tools in sealing wax. The tool is heated to whiteness and plunged into the wax, withdrawn after an instant and plunged in again, the process being repeated until the steel is too cold to enter the wax. The steel is said to become, after this process, almost as hard as the diamond, and when touched with a little oil or turpentine the tools are excellent for engraving, and also for piercing the hardest metals.

## Why Nuts Work Loose.

Mr. Rose explains that the tendency of a nut to unwind and recede from the pressure upon its radial face is proportionate to the pitch of the thread and the diameter of the bolt; and the finer the thread upon a given diameter of bolt, or the larger the diameter of bolt with a given pitch of thread, the less will be the tendency of the nut to move back. In the case of ordinary bolts and nuts, a given diameter of bolt is given a standard pitch of thread, and these pitches are not so fine as to prevent the nuts from unscrewing in many cases, unless check nuts are used. It would appear that if the nut thread fits reasonably tight upon the bolt, and the nut is screwed well home, it would remain there; but there are palpable reasons why it should not do so. Of these the chief are the errors which ensue from the alteration of form which takes place in the screw-cutting tools during the hardening process.

As a rule, all steel increases in dimensions from being hardened. What the amount of increase or expansion is, we have at present no definite knowledge, because it varies considerably, although it is probably the same when the conditions are identical. Suppose, then, that a tap is made of the correct diameter to a vernier gauge, and that it increases in diameter and in length (as it almost invariably does) during the hardening, then the pitch, the thickness, the depth and the diameter of the thread will be altered and "out of true." Unless both the tap and the die are tempered to precisely the same shade or color, the amount of error will vary. As a result of these at present irremediable errors, taps are made to suit existing solid dies, or adjustable dies are set to suit the taps; and though the nut may fit closely to the bolt, so as to be just movable by hand, or under the moderate pressure of a wrench, yet the sides of the thread do not fit properly, nor can they be made to do so under any ordinary conditions. The result is that, under vibration, the threads give way on the contact sides; for vibration is, in effect, a number of minute blows. Under reciprocating motion the result is precisely similar; for the whole pressure upon the nut is supported by that part of the surface of the thread which is in contact, which compresses or rescedes. Any machinist who desires to test this matter may do so by taking a nut that fits very tightly upon a bolt, and striking upon the sides, he will find it will lose the fit to the bolt. —*Iron Manager.*

The reduction of cost in the manufacture of iron and steel during the last 25 years has been truly wonderful, and yet the farthest limit of economy appears to be as far off as it was at the beginning of the period we have mentioned. Indeed, the ladder of progress in this direction, like the ladder Jacob saw in his dream, apparently reaches to the sky. The position already attained has been reached partly by short steps and partly by great strides, but the movement has been steadily onward, one step upward affording vantage ground for another. We are led into these reflections by the announcement of an invention, which, we are reliably informed, effects a great saving of coal in the processes of puddling and heating iron. By this invention the gas which arises from the burning coal in the heating and the puddling furnaces is again brought into service, effecting a saving of 33% on the quantity of coal ordinarily consumed in such furnaces. The invention can be applied without any alteration of the furnaces whatever, and the cost never exceeds \$35 per furnace. Mr. B. C. Lauth, so well known to the iron trade of America and Europe, has formed a company, of which he is general manager, for the manufacture and introduction of this invention. Seventeen have already been put in the Bethlehem Iron Works, and quite a number in other mills in the eastern part of Pennsylvania. —*Am. Manufacturer.*

**SUBSTITUTE FOR PLATED METALS.**—An Englishman has invented an alloy which provides an inexpensive substitute for bell metal, silver or electro-plated metals, used for making ships' fittings, harness fittings, taps and cocks. The alloy is composed of 45 to 60 parts by weight of refined copper, 20 to 30 parts of zinc, 18 to 25 parts of nickel, and if the castings are required to be turned, two or three parts of lead. The proportions can be varied according to the purity of the metals used, and the color or quality of the alloy to be produced. The copper and nickel are first melted together in a crucible, and the temperature is allowed to fall. When the zinc, or zinc and lead are added with a small quantity of potash, soda and borax, the whole is covered with finely powdered charcoal; the temperature is then rapidly raised and the whole well stirred, then skimmed and immediately poured into the molds, or it may be cast into ingots first, in which case a greater percentage of zinc is added to make allowance for waste of the metal in remelting. Articles made from this alloy take a brilliant polish, and in appearance resemble silver or nickel.

**IMPROVED STEAM VALVE.**—Bahcock & Wilcox, of New York city, have recently taken out English patents upon a means of operating valves for steam engines, as well as some improvement in boilers or steam generators. They seem to have combined the Corliss type of valve with a style of link somewhat resembling the Allen, which is in reality a double link.

# SCIENTIFIC PROGRESS.

## A Novel Theory.

It is well known that, connected with all organisms, there are certain gaseous substances (odoriferous substances), which must play a very important part in human economy, but one hitherto quite undefined. Prof. Jaeger, a German chemist of some note, who has been pursuing investigations in this direction, has quite recently advanced a novel theory in regard to the matter. He endeavors to show that the actions of the human mind are largely influenced by these substances, as they are given off in the acts of breathing and perspiring. He divides them into two groups—emanations, or substances of pleasure, and substances of dislike—"lust and unluststoffe." The first are exhaled during a joyful and gleeful state of mind, and he further holds that they produce a similar state of mind, if inhaled by another. Just the reverse is true of the other. Whoever, he says, will take the pains, can discover for himself the effluvia from the body differs as much from the varied conditions of the mind as from that of the body.

During seasons of joy and happiness the odor of perspiration is not generally disagreeable, while during periods of anguish and unpleasant nervous excitement it is always offensive. In an atmosphere charged with the substance of dislike the vitality of the system is lowered and disadvantageously influenced. This, he holds, accounts for the acknowledged fact that in a state of anguish and fear the body is more susceptible to contagious diseases. The inhalation of the substance of pleasure heightens the vital action and improves the power of the body to resist disease. Prof. Jaeger further announces that wool fiber has a natural attraction for substances of pleasure, apart from its natural capacity for absorbing odors generally, while plant fiber favors the absorption of substances of dislike. Woolen garments, the Professor says, even in summer, when evaporation is large, take on only the sour smell due to continued perspiration, and never accumulate to any considerable extent, other offensive odors, while cotton and linen clothing, after long wear assume a marked repulsive smell. If the truth of this theory should be fully established, it could not fail to be of immense value to medical science in devising ways and means to most effectually protect the human system from contagious and other diseases. —*Californian for May.*

## Microscopic Structure of Metals.

Considerable attention has been given of late to the minute structure of minerals and metals, by aid of the microscope. Allusion has already been made to the microscopic study of minerals in these columns. The same method of study has also recently been applied to the structure of metals. J. Vincent Elsdon communicates some interesting information in this direction to *Nature* of February 24th, from which we condense: Notwithstanding the great opacity of metals, it is quite possible to procure, by chemical means, metallic leaves sufficiently thin to be examined with the microscope by transmitted light. Silver leaf, when mounted on a glass slide, and immersed for a short time in a solution of perchloride of iron or potassium cyanide, becomes so reduced in thickness that its structure may be readily examined. A very satisfactory examination of silver leaf may also be made by first converting into a transparent salt by the action of chlorine or iodine. Most of the metals may also be examined by the use of similar means. Such examinations of metals show two general types of structure, one being essentially granular, the other fibrous.

The granular metals, such as tin, present the appearance of exceedingly minute grains, each one being perfectly isolated from its neighbors by still smaller interspaces. The cohesion of such leaves is very slight. The fibrous metals, such as gold and silver, have a very marked structure, and appear to consist of a mass of fine, elongated fibers, matted and interlaced in a manner much resembling mats of hair. This fibrous structure is more marked in silver than in gold. The fibrous structure, is, no doubt, developed by pressure. Their molecules, when forced to spread out, seem to glide over one another in direct lines—such being the lines of least resistance. This peculiar development of fibrous structure, Mr. Elsdon thinks, may serve to illustrate the probable origin of the fibrous structure of the limestones of the Pyrenees, Scotland, and the Tyrol.

**NEW PYRAMIDS DISCOVERED.**—It is announced among the latest reports from Cairo that two pyramids, hitherto unknown to European travelers, have recently been discovered to the north of Memphis and near Saggarah. These pyramids bear evidence that they were constructed by kings of the sixth dynasty. The rooms and passages, so far as they have been explored, are more profusely than any other covered with inscriptions.

**A CURIOUS EXPLOSIVE.**—An alloy of rhodium and lead, lately exhibited before the French Academy of Sciences, has the curious property of exploding on exposure to heat, as in being held before a gas flame. Its composition is one-third rhodium and two-thirds lead, fused together in a crucible, at a high temperature.

## Possible Revelations of the Microscope.

Much speculation and no inconsiderable experimental study has, of late, been devoted to the query, "Can we hope that the microscope will reveal to our vision an atom or molecule?" The highest magnifying power that has yet been obtained is the distinct revelation of the *striae* upon the *amphipleura pullida*, which number 132,000 to the inch. The highest artificial markings which can be resolved, by ordinary microscopic experts, are 90,000 lines to the inch; but Helmholtz, about a year ago announced that he had been able to distinguish Nobert's lines ruled 112,000 to the inch—and yet the same eyes, aided by the same instrument, failed to define the individual atom or molecule. Fasoldt has devised a ruling machine so superior to that employed by Helmholtz, that, with it, he claims that he can rule 10,000,000 of lines to the inch. These lines are ruled so close that no microscope has yet been able to reveal them to the human eye; yet Fasoldt says they must be there, for his machine must make them, and he is now waiting for some instrument powerful enough and some eye keen enough to reveal them.

Prof. Rogers says that the probable limit of the eye's capacity for seeing is about 4,000,000 lines to the inch. It would seem now to be in order that Fasoldt should make a machine, with progressive powers of ruling, to determine the ultimate capacity of the human eye. Whatever that may be, however, it is certain to stop far short of the power to define the ultimate molecule; for Helmholtz asserts that the molecules of water cannot be far from an approximation to 250,000,000 to an inch. Leihg says that "the chemist merely maintains the firm foundation of his science, when he declares the existence of physical atoms and molecules as an incontrovertible truth." Yet, like Fasoldt and his lines, he has never seen them, but just knows they are there. It has been suggested that the improved microscope of the future will have to be constructed with diamond or sapphire lenses—materials possessing greater refractive power than glass, but that even then the molecule will be a hidden mystery, even though Fasoldt's 10,000,000 of lines to the inch should be plainly visible. —*Californian for May.*

**EXPLOSION OF BODIES UNDER ELECTRICAL FORCES.**—Some important investigations in the expansion of materials under the influence of electrical forces have been made public by Prof. Quincke, some of the more important conclusions from which are as follows: Solid and liquid bodies alter in volume when acted upon by electrical forces. This is not the effect of heat. Most bodies expand, but some contract, notably the fatty oils. Gases do not appreciably change their volume. Some bodies take on the change instantaneously, others more gradually. Tubular condensers change simultaneously in length and volume. In some bodies, notably German glass, the change is, in some measure, prolonged after the action of the electrical forces ceases. The change of volume does not result from an electrical compression of the insulating substance. The elasticity of some substances is increased and that of others diminished. The electrical piercing of bodies is due to unequal electrical expansion. Solid and liquid transparent substances become double refracting under the influence of unequal expansion. These investigations have added a long list of experimental data to electrical science.

**THE COMPASS ON IRON SHIPS.**—A method of neutralizing the influence of masses of iron upon magnetic compass needles is said to have been worked out by Capt. Witt, of the *Birmah*, an English iron vessel in the India trade. The ship was provided with both binnacle and standard compass, as usual, both of which varied from one and a half to three points. Capt. Witt tried the experiment of surrounding the compass with a quantity of earth, which he accomplished by hedging the compass deeply in soil placed in a half cask divested of its iron hoops. It is claimed that, in some unexplained manner, this practically reduced the variation to a quantity not greater than it met with in wooden vessels. The validity of the experiment has been vouched for by Capt. Blanche, an adjuster of compasses, who has repeated the experiment, but the statement needs further verification. If the results are as stated, the discovery is a very important one, lessening the dangers of navigation in iron vessels.

**PHOSPHORESCENT ILLUMINATION.**—The property of phosphorescence has attracted much attention during the past year as a means of illumination. Numerous practical applications of it have been suggested, and some, notably Balmains luminous paint, have been introduced in the markets of Europe and America. An important attempt to utilize phosphorescence excited by electricity, as a means of subdividing the electric light, has been made by Dr. Phippsou. He incloses barium sulphide, or some other substance which is rendered phosphorescent by the solar rays, in a Geissler tube, through which he passes a uniform electric current of feeble intensity. He claims to obtain, in this manner, a uniform and agreeable light at a cost below that of gas. It is possible that this clew, followed out, may result in something valuable. The experiment is very suggestive, and the action of the electric current upon phosphorescent substances has been comparatively little studied.



## Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending Apr. 7.	Week Ending Apr. 14.	Week Ending Apr. 21.	Week Ending Apr. 28.
Alpha.....	31 3 4.60	3 64 4	3 64 4	3 64 4
Albion.....	2.95 1.80 31	2.85 41 3.30	4.45 2.70	2.70
Andes.....	2.15 1.50 4.20	2.15 2.90 2	2.90 2	2
Albion.....	2.20 1.90 3	1.90 3.40 2.85	4.00 2.85	2.85
Argenta.....	40c	40c 30c 45c	40c 50c	45c
Ardena.....	20c 15c 20c	25c 35c 15c	30c 20c	20c
Belcher.....	2.30 1.85 3	2.10 3.10 2.55	3.70 2	2
Belmont.....	30c	40c 65c 45c	65c 45c	45c
Best & Belcher.....	9 8 10 11	12 11 12 11	12 11 12 11	12 11 12 11
Bullion.....	1 1.35 1.85	1.45 21 1.80 1.80	1.35 1.35	1.35
Bechtel.....	55c	1 75c 90c	70c	70c
Belle Isle.....	45c	40c 45c	50c	50c
Belle Isle.....	61 63 6 7 1	61 61	61	61
Benton.....	80c 60c 95c	75c 14 85c 95c	75c	75c
Bulwer.....	2 1.90 21 2	4 3 3	2	2
Boston.....	60c	1.60 60c	60c	60c
Black Hawk.....	20c 15c 25c	30c 25c	25c 90c	90c
Belvidere.....	10c	10c 10c	15c 10c	10c
Booker.....	45c 15c 45c	40c 80c 45c	45c 40c	40c
Calaveras.....	1.50 1.05 1.10	1 1.60 1.10	1.10 1.10	1.10
Challenge.....	85c 70c 15	1.05 1.30 1.10	1.10 1.10	1.10
Chollar.....	2.60 2 2.95	2.60 3.90 3.30	3.30 2.60	2.60
Confidence.....	4 31 5 3.80	6 4 2.30 31	2.30 31	2.30
Con Imperial.....	20c 15c 20c	10c 30c 20c 25c	15c 15c	15c
Con Virginia.....	2.20 1.90 2.20	1 2 6c 12 2 2.55	2.55	2.55
Concordia (Va.).....	1.45 1.35 21	1.40 3.05 2.05 2.85	1.60 1.60	1.60
Columbia.....	15c	25c 30c	30c	30c
Champion.....	1.90	1 1.60 1.55	1.55 1.55	1.55
Concordia.....	55c 35c 50c	30c 25c 35c	15c 15c	15c
Con Pacific.....	80c	90c	90c	90c
Derbec.....	45c 40c 60c	65c 45c 40c 65c	55c 55c	55c
Day.....	1.05 1.15 1.15	2.05 1.55 1.70 1.1	1.1	1.1
Eureka Con.....	11 1.05 1.15	1.15 2.05 1.55 1.70 1.1	1.1	1.1
Excelsior.....	85c 50c 55c	50c 50c 40c 95c	50c 50c	50c
Golden Gate.....	2.20 1.90 2.20	1 2 6c 12 2 2.55	2.55	2.55
Goodhue.....	75c 60c 65c	60c 75c 70c 75c	60c 60c	60c
Gould & Curry.....	54 44 64	54 84 72 62	62 62	62
Hale & Norcross.....	4.15 3.65 6	4.10 63 54 62 43	62 43	62
Head Center.....	35 22 3	2 3 2.60 2 1	2 1	2 1
Hussey.....	10c	10c	10c	10c
Independence.....	40c 25c 40c	30c 70c 40c 55c	30c 55c	30c
Julia.....	65c 60c 70c	65c 130c 70c 110c	70c 70c	70c
Justice.....	15c	15c	15c	15c
Justus.....	15c	15c	15c	15c
Kentuck.....	2 1.30 2.90	1 4 2	4 2	4 2
Kossuth.....	60c	60c	60c	60c
Lady Bryan.....	20c 15c 20c	15c 25c 20c 20c	20c 20c	20c
Lady Wash.....	20c 15c 20c	15c 25c 20c 20c	20c 20c	20c
Leviathan.....	20c 15c 20c	15c 25c 20c 20c	20c 20c	20c
Leeds.....	10c	10c	10c	10c
May Belle.....	10c	10c	10c	10c
Medora.....	10c	10c	10c	10c
Manhattan.....	10c	10c	10c	10c
Martin White.....	10c	10c	10c	10c
McClintock.....	10c	10c	10c	10c
Mono.....	1 80c 95c	1 3 1.10 1.90	1.60 1.60	1.60
Mexican.....	54 85 8	5 12 7 9 8	8 8	8
Mt. Diablo.....	25c 20c 10c	5c 10c 5c	10c 5c	5c
Mt. Potosi.....	1.80 1.80 1.80	1 2 1.70 2 1.70	2 1.70	2 1.70
Noonday.....	1.80 1.80 1.80	1 2 1.70 2 1.70	2 1.70	2 1.70
North Belle.....	1.45 1.45 1.45	1 1.45 1.45 1.45	1.45 1.45	1.45
North Noonday.....	1.20 1.20 1.20	1 1.20 1.20 1.20	1.20 1.20	1.20
Navajo.....	1.10 1.10 1.10	1 1.10 1.10 1.10	1.10 1.10	1.10
Occidental.....	1.10 1.10 1.10	1 1.10 1.10 1.10	1.10 1.10	1.10
Opbr.....	4 3.85 8	4.30 9 7 18 6	6 18	6 18
Original Keystone.....	1.35 90c 1.40	1.10 2.55 1.35 2.30	1.80 1.80	1.80
Overman.....	90c 75c 90c	75c 13 11 12	15c 15c	15c
Oro.....	60c 55c 60c	55c 60c	60c 60c	60c
Pack.....	2.40 2.40 2.40	2.40 2.40 2.40	2.40 2.40	2.40
Queen Bee.....	5c	5c	5c	5c
South Bulwer.....	2.70 2.20 31	2 4 3 4 3 4	3 4 3 4	3 4
Savage.....	2.70 2.20 31	2 4 3 4 3 4	3 4 3 4	3 4
Sierra Nevada.....	9 7 17	9 16 12 14 10 1	10 1	10 1
Silver Hill.....	24 24 24	23 23 23 23 21	21 21	21 21
Silver King.....	24 24 24	23 23 23 23 21	21 21	21 21
Suocor.....	25c	25c	25c	25c
Summit.....	1.30 1.15 2.40	1 30 21 2 21 1.70	1.70 1.70	1.70
Scorpion.....	25c	25c	25c	25c
Solid Silver.....	25c	25c	25c	25c
South Boulder.....	25c	25c	25c	25c
South Standard.....	25c	25c	25c	25c
Syndicate.....	25c	25c	25c	25c
Tioga Con.....	40c	40c	40c	40c
Tiptop.....	4.40 4 4 4	4 4 4 4 4 4	4 4 4 4	4 4
Tuscarora.....	15c	15c 10c 20c 10c	10c 10c	10c
Union Con.....	8 6 11	8 12 10 10 8 8	8 8	8 8
Utah.....	8 11 8	8 12 10 10 8 8	8 8	8 8
Ward.....	2 1.90 2	2 2 2	2 2	2 2
Wales.....	1.10 90c 1.45	1.20 14 1.40 1 1.40	1.40 1.40	1.40
Yellow Jacket.....	31 2.15 5	3.65 64 5 5 42	42 42	42 42

## Sales at S. F. Stock Exchange.

Thursday A.M. Apr. 28.	645 Potosi.....	41@4.40
50 Alpha.....	375 Savage.....	41@4.35
740 Alta.....	210 Sierra Nevada.....	102@1.11
730 Andes.....	215 Scorpion.....	1.85@1.61
720 Belcher.....	210 Union Con.....	1.85@1.61
510 Bullion.....	275 Union.....	1.91@1.93
120 B & Belcher.....	150 Ward.....	2
330 Benton.....	800 Yellow Jacket.....	5@25
620 Belmont.....	800 Yellow Jacket.....	5@25
500 Concordia (Va.).....	1100 Argenta.....	3.95@3.90
100 Curcio.....	680 Albion.....	3.95@3.90
85 California.....	30 Bodie.....	6
435 Con Imperial.....	50 Bechtel.....	70c
460 Crown Point.....	300 Black Hawk.....	25c
60 Confidence.....	100 Bulwer.....	25c
500 Caledonia.....	300 Day.....	7c
485 Con Virginia.....	200 D Standard.....	25c
380 Chollar.....	50 Eureka Con.....	25c
625 Excelsior.....	40 Grand Prize.....	4.35@4.30
200 Golden Gate.....	500 Mt. Diablo.....	54
470 Gould & Curry.....	500 Mt. Potosi.....	50c
580 Hale & Norcross.....	190 N Noonday.....	1.30@1.11
720 Justice.....	300 N Standard.....	2.10
330 Julia.....	500 Queen Bee.....	10c
80 Kentuck.....	200 S Bulwer.....	30c
300 Lady Wash.....	200 S Bulwer.....	30c
710 Mexican.....	200 Bodie.....	25c
50 New York.....	150 Syndicate.....	4.40
250 Orig Gold Hill.....	200 Summit.....	50c
450 Opbr.....	100 Silver King.....	221
430 Overman.....	545 Tiptop.....	4
50 Occidental.....	100 Tuscarora.....	10c

**STEATITE.**—The great value of steatite and soapstone for stove backs has long been known, but it is not many years since it came into vogue as a boiler covering, though now boilers and steam-pipes everywhere are covered with the compound. Mr. L. L. Merrell, who manufactures this, is also patentee and manufacturer of the Universal wire-bound boiler covering, which has no equal as a non-conductor. Mr. Merrell is also a dealer in asbestos and asbestos materials, hair felting, Lowell Felts, steatite mastic roofing, paints, etc. The mastic roofing is very durable, easily kept in repair and can be shipped like oilcloth anywhere. It is a great protection against fire and water. The steatite paint composition is a wood preservative. A visit to Mr. Merrell's factory at 314 Townsend street, in this city, will be of interest to any one who wishes to see how these non-conductors are utilized. His office is at No. 22 California street.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

### ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQNT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co	Nevada	20	50	Mar 5	Apr 12	W H Watson	302 Montgomery st
Best & Belcher M Co	Nevada	20	50	Mar 17	Apr 20	W Willis	309 Montgomery st
Andes S M Co	Nevada	27	50	Mar 17	Apr 17	J W Crockett	327 Pine st
Belmont M Co	Nevada	28	10	Mar 8	Apr 17	J W Peck	310 Pine st
Caledonia S M Co	California	24	25	Mar 5	Apr 9	R Wegener	414 California st
Crown Point G & S M Co	Nevada	45	50	Mar 23	Apr 29	Jas Newlands	327 Pine st
Day Silver M Co	Nevada	9	25	Apr 16	May 3	J W Peck	310 Pine st
Hale & Norcross M Co	Nevada	68	50	Mar 17	Apr 14	J F Lightner	309 Montgomery st
Justice M Co	Nevada	34	25	Mar 26	Apr 29	R E Kelley	419 California st
Leviathan M Co	Nevada	12	25	Mar 23	Apr 26	F A Frisley	330 Pine st
Mono G M Co	California	11	50	Mar 17	Apr 22	W H Lent	309 Montgomery st
Northern Light M Co	California	15	50	Mar 18	Apr 21	C L McCoy	309 Montgomery st
Overman M Co	Nevada	49	50	Mar 17	Apr 21	G D Edwards	414 California st
Occidental Con G M Co	California	6	04	Feb 21	Apr 21	W T Smith	402 Montgomery st
Opbr M Co	Nevada	39	100	Mar 9	Apr 14	C L McCoy	309 Montgomery st
Phil Sheridan M Co	Nevada	11	10	Apr 4	May 5	D W Hughes	320 Pine st
Peck M Co	Arizona	3	100	Apr 14	May 23	Chas T Bridge	224 California st
Savage M Co	Nevada	46	50	Apr 4	May 6	E B Holmes	309 Montgomery st
University G M Co	California	8	10	Apr 6	May 12	Wm Letts Oliver	309 Montgomery st

### OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQNT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Amelia G M Co	California	1	10	Mar 14	Apr 22	J B Leighton	527 Clay st
Black Hawk G M Co	California	11	10	Mar 14	Apr 22	A H Charles	409 California st
Brooklyn Con M Co	California	12	10	Mar 14	Apr 22	J M McGeehan	318 Pine st
Butte Creek H M Co	California	7	10	Apr 21	May 26	R L Taylor	320 Montgomery st
Con Imp M Co	Nevada	15	10	Apr 18	May 4	J W Dean	309 Montgomery st
Delano G & S M Co	California	1	05	Mar 23	Apr 26	J Morizo	328 Montgomery st
Golden Gate Con H M Co	California	4	50	Mar 25	May 3	J T McGeehan	318 Pine st
Grand Prize Con M Co	California	4	09	Mar 24	Apr 29	E M Hall	327 Pine st
Eintracht G M Co	California	6	05	Mar 12	Apr 18	H Kunz	209 Sansome st
Florida Hill M Co	Idaho	3	30	Mar 17	Apr 25	R Wegener	414 California st
Iowa M Co	Nevada	13	06	Apr 23	May 30	Chas C Leavitt	411 California st
Independence M Co	Nevada	7	25	Apr 5	May 5	E W Hal	327 Pine st
Julia M Co	Nevada	12	25	Mar 19	Apr 22	E C Masten	309 Montgomery st
Lady Washington Con M Co	Nevada	2	10	Apr 15	May 20	W H Watson	302 Montgomery st
Liguria G & S M Co	Nevada	1	25	Apr 2	May 6	A B Cooper	328 Montgomery st
Lodi M Co	Nevada	2	10	Apr 22	May 26	A B Paul	328 Montgomery st
Lord of Lorn G M Co	California	1	15	Mar 19	Apr 23	R N Van Brunt	318 Pine st
Mammoth M Co	California	8	25	Apr 13	May 7	A W Rose Jr	302 Montgomery st
May Flower G M Co	California	11	10	Apr 12	May 18	J Morizo	328 Montgomery st
Maryland Con G M Co	California	2	25	Aug 10	Apr 20	E D Farnsworth	219 Sansome st
Mayhew Con M Co	California	7	10	Mar 19	Apr 14	W J Taylor	310 Pine st
Monterey Tunnel M Co	California	4	50	Mar 19	Apr 2	F E Luty	330 Pine st
Mono M Co	California	5	10	Mar 8	Apr 13	L Lillie	607 Washington st
McElroy Gravel M Co	Arizona	3	25	Jan 12	Apr 29	J Morizo	328 Montgomery st
McMillan S M Co	Nevada	14	25	Mar 19	Apr 23	J J Scoville	309 Montgomery st
Martin W M Co	Nevada	6	25	Apr 6	May 13	J E Holmes	318 Pine st
Mt Potosi Con M Co	California	1	10	Apr 25	June 1	O Van Dyck Hubbard	310 Pine st
North Standard G & S M Co	Nevada	4	25	Mar 19	Apr 22	F E Luty	330 Pine st
Original Keystone M Co	Nevada	2	07	Apr 6	May 13	Wm Letts Oliver	328 Montgomery st
Paradise Valley M Co	Nevada	14	25	Jan 21	Apr 23	E C Masten	310 Pine st
Real Del Monte M Co	California	7	5	Mar 19	Apr 25	W G Hughes	330 Pine st
Rocky Point M Co	California	15	50	Mar 23	May 2	C Van Hubbard	310 Pine st
Real Del Monte M Co	California	3	05	Apr 19	May 20	Lewis Lillie	607 Washington st
Swamp Angel G M Co	California	2	05	Apr 5	May 14	M A Wheeler	320 Sansome st
Suaves M Co	California	12	10	Mar 19	Apr 2	H E Luty	330 Pine st
San Pedro M Co	Arizona	1	05	Mar 6	May 2	Henry Deas	309 Montgomery st
Tuscarora M & M Co	Nevada	8	15	Apr 2	May 9	M E Sperling	309 California st
Trojan M Co	Nevada	13	10	Mar 7	Apr 11	David Wilder	328 Montgomery st
Tilden M Co	Nevada	16	100	Mar 12	Apr 11	E C Masten	309 California st
Union Con M Co	California	16	100	Mar 12	Apr 11	M Buthington	309 California st

### MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	OFFICE IN S. F.	MEETING.	DATE.
Buckeye H & W M Co	Montana	320 Sansome st	Annual	May 2
Con Imp M Co	Nevada	309 Montgomery st	Annual	May 4
Gopher Con M Co	Nevada	404 Montgomery st	Annual	May 7
Union M Co	Nevada	419 California st	Annual	May 2
Oakland G M Co	Nevada	430 Montgomery st	Annual	May 7
Unida M Co	Nevada	Merchants Ex	Annual	May 2
Silver King South M Co	Arizona	320 Sansome st	Annual	May 2
Woodville Con M Co	California	419 California st	Annual	May 2



Goodshaw, South Bodie and University. Bechtel will probably remain idle until some arrangement is made about the mill. The Syndicate is still stopping and milling ore. Several tons of ore from the Vortex (which has long been idle) is being run through the Miners' mill, and we understand the average pulp assay is about \$35. Bodie Tunnel is still breathing ore from the Fostoon or No. 20 vein, and vein No. 7 is also yielding some very good ore. The principal owners of the tunnel property are expected here during the week, and it is highly probable that they will make arrangements with the Goodshaw Co. for the erection of a joint mill of some pretensions. The new hoisting engines of the Standard Con. are now in good working order. There is no change to note in either crosscut of the 1000 level, and the face of the east crosscut, 700 level, 113 ft east of the main vertical shaft, is in very hard rock. The slopes are all looking well, some of them still yield very rich ore. Con. Pacific is showing fine silver ore in the north drift from the east crosscut, 600 level. The east crosscut, 600 level of the Jupiter, is in 98 ft, having passed through the hard bar and come into more favorable ground, indicating the proximity of the east Savan vein. The South Bulwer has its new engine in position and will resume sinking about the first proximo. Toga still has a pretty heavy flow of water, but the north drift from the east crosscut and the west crosscut, 682 level, are both being pushed as usual, the former in good ore and the latter in feeders of quartz carrying gold. The shaft of the Boston Con. is down 71 ft below the 300-ft station, with strong indications that the shaft is nearing the east vein. In Bulwer Con. an upraise recently commenced in the Stonewall ledge, south of the shaft, 400 level, is in 2 1/2 ft of ore. The Bodie is looking well throughout and is turning out some very rich ore. Oro is making very satisfactory developments in all directions. Noonday is showing some improvements south, both on the 412 and 512 levels, and all the machinery of the mine and mill is working finely. North Noonday is also improving on the 312 and 412 levels, the slopes from the latter level showing a vein of good ore from 5 to 12 ft wide. The north drift on the main east vein of Concordia is being vigorously pushed, and the vein is large, strong, and looking well. The last shaft is down 575 ft, the bottom still in very hard rock, with no signs of water, and it is now hoped that water will not interfere until the 600 ft station is opened. But little was added to the depth of the Red Cloud shaft during the week, owing to stoppage to add to the pump columns, but the pump started up again last evening. The new shaft of the South Noonday is down 140 ft, in favorable ground, and a steam engine will shortly be put up to facilitate matters.

#### NEVADA.

**BANNER.**—Nevada Transcript, April 19: Five tons of ore from the 3-ft ledge at the Banner mine, which produced at the surface the marvelously rich specimens a few days ago, has been taken to the Pioneer mill to be worked. It is dark blue in color, being a strong red to the old Banner ore, and is apparently well charged with rich sulphurates. If it pays well a shaft will be put down in that part of the ground immediately. The ledge is also being drifted from the present incline.

**ANOTHER RICH STRIKE.**—Night before last, while a crosscut was being run on the 250 level of the Nevada City mine, a 10-inch ledge of ore that is estimated to be worth \$2,000 a ton was discovered. It runs up a declivity and the shaft has been worked, and up to noon yesterday has been followed a distance of 8 ft and found to maintain its grade.

**BLUE TINT HYDRAULIC MINER.**—The new bedrock tunnel at the Blue Tent mine is now within 350 ft of the first shaft. Mr. Lacy, of the firm of Parke & Lacy, at San Francisco, is here putting in a Barfield drill, which the company has determined to use in order to facilitate the progress of the tunnel. About 100 men, a large number of which are white, find employment in the mine. Five monitors are used for washing, the head of water amounting to 2,600 inches. Supt. Powers says that he hopes to see electric lights introduced in the claim very soon, so that work can be carried on at night the same as by day, as is the case at other large hydraulic mines in the country.

**RICH ROCK.**—There were to be seen yesterday at a business place in town two chunks of ore from a declivity in the district, that would make a Forty-niner smile all over. They showed gold on every side and point, and contained at least \$100 worth of it apiece. That amount was offered for one of them by a shrewd miner, but the owner refused the bid. The formation of the vein matter showed clearly that it was not from a pocket. The holder of the claim is opening it up as rapidly as possible, and within the next few weeks will know just what kind of a strike he has made.

#### PLACER.

**STAIRS.**—Placer Times, April 21: We are informed by good authority that a rich strike has been found in the Golden Bul drift gravel mine over at Lowell Hill. Some very rich gravel has been found while extending the tunnel, which promises a large yield of gold.

**PROSPECTING.**—The Wide West drift gravel mine at Remington Hill is prospecting finely at the present time—in fact a good, rich body of gravel was run into last week, in the main tunnel, and should the find keep up a large amount of gold will be taken out during the next few weeks.

**MICHAEL BLUFF.**—Cor. Placer Herald, April 21: Our little town is full of diggers, quartz sharps, and mining men of all kinds from Virginia City, Salt Lake, San Francisco and other places. Col. Krown is pushing his prospecting tunnel ahead, and seems well satisfied with his prospects. The Rainbow mine is again taking out rich gravel. The old Alabama Bar claim is being fitted up for an active summer's work. It is situated on the South Fork of the Middle Fork of the American river, above Junction Bar. The mine is owned by a San Francisco company, and the work is done under the supervision of Matt Hazlett, who is an old experienced river miner.

**IOWA HILL.**—Cor. Placer Argus, April 23: All the mines are at work, doing their best to utilize the water, knowing that their working days for this season are nearly numbered.

#### PLUMAS.

**OLD STRIPS.**—Greenville Bulletin, April 21: From Supt. Standart, who called on Monday, we learn that work continues without cessation and the mill is running steadily on good rock. It will be but little more than a week before they will also start the Wisconsin mill.

**PLUMAS NATIONAL.**—W. B. Oibert has resigned as superintendent, and is succeeded by Maj. Miles C. Seldio, of San Francisco. The numerous experiments in regard to the process of chlorination, made by Mr. C. H. Aaron, were continued until the entire working was perfectly successful and satisfactory, and there will now be no further interruption. The furnace has a capacity for roasting 3 tons per day, and is under the charge of Mr. Oscar Vogel, who is thoroughly familiar with the business. The west drift is now in about 30 ft, and pay ore is soon expected to be reached. The mill and concentrators are doing excellent work and good results may confidently be soon expected.

#### SAN BERNARDINO.

**ORANGEVIEW DISTRICT.**—Colton Semi-Tropic, April 23: Grapevine district, in which is situated the Waterman mine, is the El Dorado of the hour. The whole section is swarming with prospectors. That the Waterman mine is immensely rich, there can now be no doubt; that other ledges equally rich on the surface have been discovered and located is equally true. Ledges have been located in the neighborhood of the Waterman mine, which promise equivalent wealth with the latter on the surface, and it is reasonable to infer that, on striking, several of them at least will develop a body of ore equal, or nearly equal, in richness to the mine which has already made the Grapevine district famous. Mr. Waterman is now down 80 ft, and the ore continues to increase in richness as he sinks. The shaft is, however, now flooded, and until the water can be pumped out further operations are suspended. The mountain on which the Covington, Horton and Davis ledges are located is some miles from the Waterman camp, but the grade of rock is precisely similar. The Yager and

Meechan ledges are in the immediate neighborhood of the Waterman, and the specimens which they brought in for assay are identical with the surface rock of the Waterman. In short, the indications are good that a great mining section has been discovered. The Grapevine district lies about 95 miles from San Bernardino. The road is good, stations are convenient, and in wood and water easily accessible.

#### SIERRA.

**A FINE PROSPECT.**—Mountain Messenger, April 23: The Bald Mountain Extension Co. got their incline down to bedrock last Tuesday night. A double track has been laid, the cars being hauled up by a windlass, kindly loaned by the Bald Mountain Co. No great amount of water was encountered. When the vicinity of bedrock was reached immense washed quartz boulders were encountered, the largest yet found weighing many tons and requiring some four or five blasts to get rid of it. The bedrock was reached Tuesday morning about 1 o'clock, and from about 4 carloads of gravel \$20 coarse washed gold was obtained. In quality the gold is very fine, assaying about 936 fine. In character and appearance the gold is like that obtained along the ridge for miles above. The company are working 3 shifts of 2 men each, and 6 boys as carmen. (Since receiving the above, a dispatch states that very rich gravel has been struck in this mine.)

**RUBY.**—The Ruby tunnel is in about 1,200 ft and is being rapidly pushed ahead.

**CONSOLIDATED.**—Six men are at work on the Willbourn Con. mine sinking a shaft to bedrock.

**STRIKE.**—The Rainbow quartz ledge is showing better and better as they get ahead. It promises to be a bonanza.

**KEY RICH.**—We are informed that the Busch quartz ledge at Locustville's diggings, is showing a great deal of the very rich rock, and further it is uncovered the richer it gets.

#### TUOLUMNE.

**RICH.**—Tuolumne Independent, April 21: Mr. Haydock, of the Rawhide mine, has struck extremely rich ore north of Jack Arnold's residence. Various rumors are afloat of an exaggerated character—that is not uncommon among many here, on any proposition. We saw a number of very large pieces that would go from \$10,000 to \$20,000 per ton.

**OLSEN.**—The management of the Olsen mine seem to be determined to work it for all it is worth, and show sound policy in employing those settlers with families living around the place whose interests are identified with that of the mine instead of employing strangers. In sinking the mine, we understand that the vein of black sulphur ore is widening rapidly; but little is said about it, however, on the outside. This ore assays \$60 per ton. The Olsen Extension, owned by the Olsen family, is to be reopened. The Peck, Johnson and Fayland claims, on the extension of the same vein as the Olsen, have all of them good prospects—the Johnson claim having streaks of ore which will pan out from \$1 to \$3 to the pan.

#### NEVADA.

##### WASHOE DISTRICT.

**CON. VIRGINIA.**—Enterprise, April 24: During the past week 45 1/2 tons of ore, assaying \$20.95 per ton, have been extracted and sent to the mill; the Joint Best & Belcher upraise has been extended 15 ft. On the 2500 level the joint California, and the C. & C. shaft has been extended 27 ft, and the joint California east drift from the C. & C. shaft has been timbered up and extended 15 ft.

**CALIFORNIA.**—During the past week 504 tons of ore, assaying \$22.75, have been extracted and sent to the mill. On the 2500 level have completed a chamber for the joint Ophir east winze and sunk and timbered the winze 5 ft. On the 2500 level the north lateral drift has been advanced 40 ft; total, 900 ft. The joint Union Con. east winze has been sunk and timbered 17 ft; total depth, 73 ft. Ore raised during the week, 271,160-000 tons.

**UNION SHAFT.**—The shaft has been sunk and timbered 8 ft. Are upraising at the 1600 and 2500 stations. C. & C. SHAFT.—Nothing except preparatory work can be done in the shaft until after the air connection on the 2500 level is made.

**HALE & MORSEKOS.**—Have started a crosscut west on the 1400 level at a point 120 ft south of the Savage Incline. During the past week have sunk and timbered the shaft 27 ft; total depth, 1,939 ft.

**UNION CON.**—On the 2500 level are cutting out a chamber for a winze joint with the Mexican in the east crosscut.

**MEXICAN.**—On the 2500 level are cutting out a chamber for winze in joint Union Con. east crosscut.

**ORNER.**—On the 2500 level have completed the chamber for a winze in the joint California east crosscut and have sunk and timbered the winze 5 ft.

**SIERRA NEVADA.**—On the 2400 level east winze No. 2 has been sunk and timbered 26 ft; total depth, 33 ft.

#### ESMERALDA DISTRICT.

**ORINDINO AWAY.**—Esmeralda Herald, April 23: The little mill is still grinding away on that 12 tons of ore from the No. 2 Esmeralda mine, and it is said it will take until about Monday night to finish the lot—8 days to grind 12 tons. The sound of the little stamps and toot of the toy-whistle is better than no music at all.

**WHAT IS GOING ON.**—The Del Monte Co. are considering the feasibility of running a drain tunnel to tap the mine at the depth of about 10,000 ft, thus not only enabling that company to prospect their property thoroughly without being bothered with water, but also draining the whole district. The New Esmeralda Con. is having 12 tons of ore crushed, and if it is demonstrated by actual working process that the thousands of tons of the same kind of ore now in sight will pay to mill, that necessary article will be created. New York parties have incorporated the McIntosh & Barnes, and are talking strongly of a mill. The probability is that the Cook Bros. will accept the prospect on the last next month, which will mean business on a large scale. Supt. W. H. Buckley is handling the Cortez and the company owning the property propose to erect a mill. A rich company will probably take hold of the famous Centennial and pull out the pure stuff this summer, and many other kites of smaller dimensions are flying about the old war-horse camp of Aurora. That our prospects are far brighter in a mining point of view than for the past 15 years there is no room for doubt.

**NEW ESMERALDA.**—A drift is being run from the main tunnel south, and is now in 10 ft, the face showing the same character of rich ore as found on the Hancock.

**CORTAZ.**—Ore from the mine is steadily accumulating on the dump.

**THE PROSPECTORS.**—The regular complement of men is still employed.

**HUNTER WEST.**—The 65-ft contract is rapidly nearing completion.

#### EUREKA DISTRICT.

**TUNNEL.**—Sentinel, April 23, During the past day or two there has been encountered in the Eureka tunnel, and there are now some 3 inches at the face of the tunnel. The striking of water is looked upon as favorable for a change of formation.

#### GRANTSVILLE DISTRICT.

**THE ALEXANDER.**—Bonanza, April 23: In the Alexander work progresses rapidly. At the bottom of the incline the station and camp, preparatory to running level No. 7, are nearly done. Every indication shows that No. 7 will have the same body of ore as was found in No. 6, but of higher grade. The mine is now furnishing an abundant supply of water for the mill, without having to call upon other resources. The mill is running in splendid style, with no stoppages and excellent results. The bullion produced averages nearly 900 fine.

**THE HOMESTEAD.**—Work goes on in the Homestead, both in tunnel and shaft. Some very fine chloride ore has been discovered.

**THE HORTON.**—The shaft has attained a depth of over 100 ft, the bottom in nice looking ore.

**THE VESTA.**—It is understood that very shortly a

wealthy company will take hold of and work it vigorously.

**THE BROOKLYN.**—In the Brooklyn an upraise from the crosscut on No. 2 is in a large body of fine grade ore.

#### OSCEOLA DISTRICT.

**DITCH.**—Ward Refex, April 16: Work on the water ditch that is to bring water to the placers of Osceola, it is reported, will be commenced on or about the 10th of May next. It may be so, "but you can't always sometimes most generally toll."

#### PIOCHE DISTRICT.

**ORE.**—Ward Refex, April 23: There has been a large quantity of chlorides ore hoisted out of the Meadow Valley mine the past week. The greater portion of this ore is rich chloride, and the owners expect to make a small little sum from the same. There were two train loads of ore brought to the Dry Valley mill the early part of the week, but owing to repairing the track no more could be shipped. The ore chutes and platform at No. 3 works are all fixed and covered with ore awaiting shipment, and considerable yet in the mine to hoist. No hoisting has been done for the past 3 days, owing to there being no room on top for any more ore until another shipment is made.

#### TAYLOR DISTRICT.

**STRIKE.**—Ward Refex, April 16: Another strike was made in the district a few days ago while grading for a road, an assay from which went \$135 to the ton. Mr. Ople says Taylor is the biggest prospect he has seen in many years. All who have visited Taylor lately join him in that opinion.

#### WHITE PINE DISTRICT.

**CONNECTION.**—Ward Refex, April 16: Connection has been made between the incline and Eberhardt tunnel, and the latest advice is to the effect that four crosscuts will be started immediately, to prospect ground on both sides of the tunnel.

#### ARIZONA.

**STRIKE.**—Cor. Arizona Journal, April 23: Since my last letter there has been a big strike in the Empire mine. They have been trying to keep the matter quiet until they knew just what it amounted to, but like all good news it leaked out and has created quite a stir in mining circles. This continues the East bonanza 1500 ft further northward, and almost assures ore in the Mesa mines. This line of bonanzas commences on the south with Grand Central, comes north into Contention, Head Center and Empire, making all told, about 6,000 feet of ore ground, mostly very rich. The main strike is similar to the rich chloride and horn silver gold ore in Head Center.

**THE MESA CON.** has incorporated and will proceed to develop their property immediately. This consists of 15 locations in a solid block, being 3 in width by 5 in length, directly in line of the heart of the ore belt as now developed.

**A HEAVY SUIT.**—Richard Gird, late Supt. of the Tombstone M. & M. Co., has brought suit against the company for the sum of \$30,000, alleging as a cause of action, that last October he loaned the company \$40,000, and that the company has withheld dividends on its stock to the amount of \$40,000 more. It looks now as though there might be a good-sized washing of dirty linen. It is a query what a dividend-paying company could go to with a loan from their superintendent of so large a sum as \$40,000. Could they have borrowed money with which to pay dividends? If not, what for? The public will not have long to wait to know, if the suit isn't settled without appeal to the courts.

#### COLORADO.

**CHALK CREEK.**—Cheffee Times, April 23: The Collum Kill lode is the new strike on Sugar Loaf mountain, near the Iron City smelter, lately made by Geo. L. Wright, Esq., the manager. There has been a drift of 15 ft on the vein, which discloses a pay streak of only 2 inches of remarkable value. It assays 90 ounces in silver, 14 ounces in gold and over 60% lead to the ton. The Hamlet lode will stop work for the present. It is probably rumored that a body of 700-ounces ore has been encountered in the second level of the Hortense.

**TROUT CREEK.**—We have been shown 3 assays, which gave 36, 40 and 82 ounces in silver to the ton. The lode is located on Iron Chest hill, about 1,500 ft southeast of the Iron Chest mine. Another strike made on Walker's hill, about 2 miles northwest, of sand carbonates is also causing considerable interest, though we have not been able to learn the particulars. We understand that a fire in the Forest City has been sold for \$2,500, and a interest in a group on Walker's hill for \$1,000, by Berry & Massie.

**COTTONWOOD DISTRICT.**—The Stars and Stripes is a new location in South Cottonwood which assays 27 ounces silver to the ton on the surface and shows a 2-ft vein. The snow is going off rapidly, and soon the hills will resound with the music of the blast and the season will be fairly opened.

**MONARCH DISTRICT.**—Henry Altman, who is now in New York, has formed a company with a capital stock of \$500,000 for the purpose of working 3 tunnels in the North Park basin. A working capital of \$25,000 has been secured. V. B. Purdum has returned from the East, where he organized the Continental M. Co., with a stock of \$175,000, at \$20 a share. The mines owned by this company are the Red Lion, Brigham Young, Lady Lurly, Cabin Boy, Jennie C. and Silver Wave, all of which promise to turn out bonanzas. The Sleeping Pet, owned by Messrs. Cramp, Eastman & Withington, is located on the Tomichi and is one of the best mines in Colorado. The owners will put in a pump and hoisting machine as soon as possible and work the mine to its full capacity. Ore from this mine assays from \$200 to \$250,000 per ton.

#### IDAHO.

**WOON RIVER.**—Cor. Salt Lake Tribune, April 24: The roads into the place are more of a matter of interest to your readers who contemplate coming here than anything else. The Kelton road is now very good up to a point 13 miles south of this town, and loaded teams can get in that far with perfect ease, with good feed for teams all the way. Then for eight miles north the road is as soft as possible, but after getting into the Wood River valley proper, the road—10 miles to Bellevue—is good. The Blackfoot coach is coming through and freight teams are beginning to come in lively. This town is full of men, principally from Nevada, and a large number has gone on to the camps up the river, and still the boys continue to arrive at the rate of about 100 per day. The hotels are full, provisions are scarce, and prices high. Bellevue is rapidly growing, new cabins going up everywhere. Town lots on Main street command prices as high as \$100, and \$500, according to location. Prospecting in the neighboring hills is lively, and some nice looking ore is being brought in. On the whole, Wood River is just entering upon an immense boom, unparalleled by anything except that of Leadville.

**SHAW'S MOUNTAIN.**—Cor. Idaho World, April 16: Our camp has begun to loom up once more. A great moon is at work in the Rising sun, extracting ore from the mine will soon be put through Plowman's mill. Mr. Thurman is driving two tunnels on the ledge, and he expects to keep the mill running all this summer. He pays \$2.50 per day, the miners working themselves. An expert miner will now and then work for these small wages, but only long enough to get a stake to go to some other camp. Joe. Robert is driving the Paymaster tunnel, and is now driving the Plowman's mill, crushing 37 tons of North Star ore, which will go \$20 to \$25 per ton. Mr. Thurman has a small force of men at work on the new furnace at the mill. He intends to roast the Rising Sun ore. The Paymaster rock that Bayhouse put through the mill was roasted on a log heap and then thrown into concentrated live water while it was hot, so it soaked up a great deal of live steam and the plates in better order, and the result was \$55 per ton. The same class of ore was put through last summer and gave only \$35 per ton; so you see all this rock needs roasting.

#### MONTANA.

**ALICE.**—Butte Miner, April 19: The strike of rich ore at a depth of 700 ft in the Alice mine, was a discovery of great importance to the stockholders of the company, as well as to the general mining industry of this district, for it established, beyond a doubt, the existence of rich ore at a great depth, and further, that instead of the value of this section showing indications of barrenness as they are next, it may be so, "but you can't always sometimes more compact in their formation. This late development in the Alice demonstrates this fact and puts the question at rest. The ore is running higher at both of the mills and the assays from the battery samples show an increased value of \$10 per ton. Yesterday the bullion shipments of the Alice company was valued at \$7,000.

**GOLDEN RULE.**—The strike of rich ore in the main shaft of the Golden Rule mine has induced the owners, Messrs. Tom Weller & Co., to put steam hoisting works on the mine. For the past two weeks the Co. has been engaged in erecting works, which are nearly completed and ready for hoisting operations.

**MOUTON.**—Last night the three-compartment main shaft of the Mouton mine had reached a depth of 283 ft, in excellent condition. In the last few ft a decided change for the better in the ore was noted. The bottom of the shaft has been noticed, and it is now much safer than heretofore, which will facilitate the dropping of the shaft with greater dispatch.

**MAGNA CHARTA.**—In the different workings of the Magna Charta mine the looking well. The bonanza streak of ore lately noticed are all holding their own, and are showing uniformly in thickness and the assay value of the ore daily extracted from the mine.

**BELL.**—The ore out pit of the mine is about 30 tons per diem. This ore is piled upon the dump, supposedly to await the erection of smelting works by the Bell Co.

#### NEW MEXICO.

**COLFAX COUNTY PLACERS.**—News and Press, April 14: With the going of winter and the coming of summer, and the abundance of water, placer mining has again been inaugurated in the old camps of Ute and Willow Creeks adjacent to Elizabethtown. The Centon, whose claim is in the Moreno, have been drifting all winter and the labor has been rewarded by the uncovering of a fine streak of rich gravel which they are now washing. Last week a run of five days was followed by a clean up which netted the boys about 25 ounces. On the 4th Mr. Lynch, with quite a force of men begun cleaning out the lower Moreno ditch, and on Monday last commenced washing on Michigan. He is also doing fine gulches and getting everything in order to hydraulic in the big cut on the Flat, as soon as the water comes through the big ditch.

**TAOS NOTES.**—Mining excitement still continues; lots of Colorado prospectors are coming in. Several very good carbonate lodes have been discovered between the Arroyo Hondo and Red river, which prospect well. Many of the mine owners on the Arroyo Hondo have commenced work in earnest and almost all of them are sanguine of success. Frazier & Co. have struck it big in their tunnel, free gold ore in a long vein that runs away up into the thousands. On the Arroyo Hondo some wonderful developments have been made. McGraw & Sam have struck in their tunnel a four ft vein of galena that is almost pure silver—60 to 75%. Some assays of Mr. Stertz from the Picuris run up to 50 and 100 ounces in silver and some gold. The Picuris mines no doubt are very rich.

#### OREGON.

**FOOT'S CREEK.**—Oregon Sentinel, April 23: We found a number of the miners still working away on their claims, though with a diminished head of water; others were engaged in cleaning up. Judging from the amount of ground worked over on this fork of Foot's creek a profitable yield of gold will result. The mines on the right bank fork of Foot's creek are scarcely opened yet. The mining claims of Messrs. Duffield, Lance & Hosmer we consider among the best in the State. All ground worked so far has prospected uniformly at 25 cents to the cubic ft. What this claim needs to make it the best in the country is a greater volume of water. Since this mine has been opened only about a quarter of an acre of ground has been worked over, with the bedrock ranging from 15 to 20 ft below the surface.

**ROCK POINT.**—Mr. Jamison, of Rock Point, tells us that Byrd and Fisher's big ditch out of Rock river to water Big Ber is under way, about one half mile being finished. The ditch will carry about 2,000 inches of water. The claim of Duffield, Lance and Hosmer, on Foot's creek is one of the best in the country. It will average about 20 ft in depth, prospecting uniformly 25 cents to the cubic ft, while the bed rock is very rich. These gentlemen have only washed off about a quarter of an acre, and have yielded over \$10,000 worth of gold in several years. Two giants are still in operation at Sterling, and nearly twice the amount of dirt washed last season has already gone through the flume. The Holman ledge is still being prospected by Richard Cook, who, it is said, has struck some small veins of very rich silver ore.

**NUOGETS.**—Democratic News, April 22: D. M. Marden, of Willow Springs, who is now cleaning up, has picked up several pieces of gold of late, some weighing as high as \$15. Enoch Roten, of Willow Springs, picked up a piece of quartz in his diggings the other day, from which he realized two ounces of gold. We learn that the company which has the Applegate Oravel Co.'s diggings leased intended suspending operations, finding recent clean ups unprofitable. Two nuggets were last week found in Yauces, Salmarsch & Co.'s claim at Sterling, weighing 830 and 812 respectively. Bybee & Fisher's ditch to the big fork of Rogue river will be done in less than two months. J. T. Layton, of Farris gulch, is about putting in a Giant with a six-inch nozzle, and enlarging the size of his flume. Green Bros., of Oallie creek, have suspended crushing quartz and are now engaged in running a tunnel to tap their ledge lower down.

#### UTAH.

**PARK CITY.**—Cor. Salt Lake Tribune, April 23: There is no disputing the fact that the present season will witness a boom in Park City, such as Wood River might do well to baffle for. We do not expect or want to see men coming in at the rate of 100 a day, unless they come to stay. Those who come will be valuable accessions to our camp, and will aid in opening up the rich fissure veins, which, it is true, require the expenditure of more time and more capital than the majority of the veins in the country. Slowly they have developed their claims one by one, often gladly selling at a trifling price good prospects, that they might have means to work others, and gradually the true value of many of these prospects are becoming known. Of all the properties that have been well opened, and upon which as much as \$5,000 and over has been expended, there is but one that has in any real sense failed. Nothing is more certain than a rich return for money judiciously invested here. The district embraces a large scope of country, much of which has not yet been prospected. The mineral belt is strong and wide, with plenty of room for scores of good mines, so no one need fear that the field is all occupied.

**THE CROSSCUT IN ORO** struck the front ledge on Thursday, and the stock quickly felt the improvement. The strike is of great importance to Bodie district.

**THE GENERAL CUSTER** mine, of Bonanza City, Idaho, produced 50 bars of bullion between February 11th and March 22d, valued at \$103,600.



## Meeting of the Railroad Commission.

There was a meeting of the Railroad Commission in this city recently. During the session there was present representatives of the leading railway companies, and a general discussion of the reduction of fares and freights was had. It seems from the reports in the daily papers that there was a direct issue between the members of the commission as to fixing upon a schedule of rates, and the result was that the matter was postponed until the meeting of May 11, 1881.

At the Saturday afternoon session of the Board reporters were strictly excluded, the watchful halliff seating himself near the door to see that the secrecy of the executive meeting privacy was not invaded. The following resolution was introduced by Commissioner Beerstecher:

*Resolved*, By the Board of Railroad Commissioners, that the following schedule of freight rates go into force and effect on the 1st day of June, 1881, on the several railroads within the State, upon whose lines the places named in the schedule are situated, and that such rates take the place of the rates now in force on said roads for the transportation of the articles named in the schedule, and between the points named, and that on and after the 1st day of June, 1881, it be unlawful to demand or receive rates in excess of the rates so fixed and established in this schedule, and, if through any error in the schedule hereto, or rate for carriage of freight appears in excess of the present rates, then the present rates shall prevail until corrected by this Board.

That the rates for carriage of freight on the Central Pacific, its branches and leased lines within this State, the Southern Pacific, California Pacific, and Northern, Stockton and Copperopolis, San Pablo and Tulare railroads, as the same are now in force and effect and on file in the office of this Board, are adopted, fixed and established as the freight rates of this Board, subject to the changes aforesaid as appearing in the schedule hereto, and subject further to all just and reasonable changes and alterations hereafter as such changes and alterations may appear desirable, just and equitable, after due notice and hearing of parties interested.

*Resolved*, That these resolutions be printed and served on the several railroad companies affected, by the halliff of this Board.

## General Stoneman Protests.

The first paragraph of the resolutions, which referred to the adoption of the schedule of rates offered by Mr. Towne at the morning session, was accepted by Commissioner Stoneman. The schedule makes a reduction on the transportation of grain of all kinds, alfalfa, cattle, and what may be generally called staple articles. The reduction has been variously estimated, but Commissioner Stoneman states that it is probably about 10%. Commissioner Stoneman, however, objected to the second paragraph of the resolution, which adopts the schedule of freights now in force for all articles except staple ones, such as grain, etc. The effect of the resolution, if adopted altogether, would therefore be to secure a reduction of about 10% on freights for grain and cattle and leave the present rates for merchandise, etc., intact. Commissioner Stoneman warmly opposed the adoption of the latter part of the resolution, and for two hours the Board was widely divided in its views, and stubbornly determined to remain so.

General Stoneman offered the following:

The act to organize and define the powers of the Board of Railroad Commissioners contemplated that the opinions of the Board shall be given in writing, and as a member of the Board I ask that the consideration of the resolution adopting the schedule fixed by the railroad mentioned in the resolution be laid over until the next session, in order that I may have an opportunity to state my reasons in writing for my vote and any action I may think proper to take in the matter.

So ordered by the Board.

It was ordered by the Board that the appearance of the several railroad companies heretofore served by the halliff of the Board under the order of this Board with printed resolutions and schedule of tariff rates for transportation of passengers, and printed summons to appear and answer within 15 days after service, and show cause why such rates should not be established and go into force and effect, be entered, and that the hearing upon the several summons be adjourned to the 11th day of May, 1881, at 10 o'clock A. M.

**SALMON RIVER MINES.**—A correspondent writes from Salmon river that the mines in that region are opening out beyond all expectation, and that the various camps along that stream will have a veritable boom this spring—not a second-class or ephemeral spurt, but a substantial upheaval, the mines being very rich and the business prospects of the most encouraging kind. The work during the winter has been extensive, and a number of very rich strikes have been made, which show that the region is not half prospected. A large quantity of first-class ore, averaging about \$300 per ton, has been taken out of the various mines, and will be shipped to the furnaces as soon as the snow is off the ground. The furnaces are preparing to start up, and will have a good summer's run, and it is quite likely that several new ones will be constructed. Challis is building up, and promises to be quite a large town, and will, no doubt, become the county seat of Custer county. The latest and biggest strike made recently was in the Faithful Boy, on Poverty Flat, where an extensive body of 800-ounce ore was found. A smelter is also to be erected on Squaw creek, where a great deal of ore awaits reduction. From these showings the Salmon river country bids fair to divide the honors with Wood river the ensuing season.

The *Free Lance* says: James Phillips died in Grass Valley Sunday. When he came to this coast some three years ago he had with him what is known as a "divining rod," or "hoodoo," an electric instrument by which it is thought gold may be found, but we believe it proved a failure.

## North Columbia.

North Columbia, or Columbia Hill as it is more commonly called, is located about seven miles in a northeasterly direction from North San Juan. The place contains a population of about 250 souls. There are several foot-hill ranches located around the suburbs of the village, but the place is dependent upon hydraulic mining. The mining interests are almost wholly in the possession of the Eureka Lake M. Co. of which R. McMurray, Esq., is superintendent. His company is operating three sets of claims which furnish steady employment to about 40 men, and indirectly, at cleaning-up times, to several more. Mr. A. S. Bigelow has a general supervision of the company's operations there with a foreman in charge of each mine. William Huff has charge of the Farrell; Chas. Gallagher of the Laird; and Martio Phelan of the Consolidated, these being the names by which the claims are respectively designated. The mines yield a rich harvest of the precious metals to the company, and the tract of rich auriferous, ancient river channel owned by it, is very large. Only a small portion of the top portion has been washed away as yet, and the richness of the bottom of the channel can only be conjectured. The company are about testing the matter to ascertain to a certainty. A shaft was recently sunk 132 ft, when bedrock was reached, which was found to be the rim of the channel. From the bottom of this shaft a tunnel was extended across the channel a distance of 780 ft, to the rim on the other side. The gravel is rich for hydraulic purposes as far as prospected. The machinery used in sinking this first shaft has been moved about 400 ft, to a point supposed to be over the center of the channel, and a new perpendicular shaft is to be sunk, to try and reach bedrock in the middle of the channel. The object is to ascertain how rich it may be, and whether it can be profitably worked by the drifting process. The present outlets do not afford an opportunity to work the mines only in part, merely to wash off the surface. To get an outlet for all the vast body of rich gravel which will remain after the surface has been washed away, will require a long tunnel from either the middle or south Yuba, and in either case the expense of running would be very great, so that with the present agitation on the debris question the company will be rather timid about undertaking so expensive an enterprise. Should the gravel be found sufficiently rich to justify working by the drifting process, it will furnish employment to many more laborers. The point where the shaft is being sunk is nearly directly underneath where the old town was located.—*San Juan Times*.

## Suggestions to Eastern Capitalists.

Eastern capitalists in search of fortunes in Arizona have occasionally failed to find them and have discovered rocks instead, upon which they have wrecked themselves, simply because they did not pay proper attention to well-known business principles. They have in several instances sent parties to our Territory to represent their interests, who, while they may have been good business men in the ordinary acceptance of the term, knew nothing whatever about mining or mines.

The old saying, that a saffaring man will bankrupt himself on a farm, applies with equal force in any other walks of life. A printer would cut a bad figure probably as a wholesale grocer, and a grocer would not make his fortune as a shoemaker. To send a person to a country to examine mines, and invest in them, who knows nothing about them is equivalent to throwing money away. Nothing in the world requires more thorough and practical knowledge for successful working than mines of gold and silver. It is a knowledge, too, which must be acquired by experience, and a very bitter experience, as a general rule.

It is for this reason that some of the best mining properties in Arizona are to-day under a cloud. Had one-third of the money thrown away in blundering efforts to develop them been judiciously expended they would be now among the most productive properties in the Territory.

Sending incompetent men to examine mining properties is a two-edged sword. It cuts both ways. It disgusts those who are so inconsiderate as to depend on these men, and it gives a bad name to the district where they have invested. Thoroughly trained and competent mining men can always be secured, whose judgment is seldom at fault, and who are not likely to throw away large sums of money foolishly. They have learned their business by serving a long and sometimes eventful apprenticeship, and it would be the part of wisdom for Eastern capitalists to employ these, both to examine and work their properties.—*Arizona Journal*.

**ALASKA MINES.**—The new mining district is all covered with snow, which is from six to ten ft. deep. Two tons of ore were blasted out on the Pilz lode, which will be forwarded to San Francisco for reduction. Some claims have been jumped in the new mines, and serious trouble is expected. There are 200 miners at Harrisburg awaiting the disappearance of the snow.

The Copper Queen mine, Arizona, has been sold for \$1,250,000, to a New York company. This is a copper mine and its product has netted eight cents a pound profit. It produces over 300,000 lbs. of copper a month.

## The Taos Mountains, New Mexico.

A correspondent of the *News and Press* says: That the Taos mountains are as rich in mineral as any in New Mexico, is beyond the question of a doubt. On the east side for years they have been noted for mineral, and until lately nothing has been done on the west side to develop its mineral.

A few go-ahead prospectors came in here last summer, many of them with but little means, as prospectors generally are, yet see the results. Good mineral, both in placer and lodes, has been discovered on all the six or seven little streams which flow into Taos valley. There is only one exception, the Rio Puelho, the center one, and no doubt the richest of any, but the Indians owning (or occupying, I had better say) a small scope of country at its entrance to the valley, will not allow any prospecting to be done on the stream.

In my opinion that objection will not last long, for it is well known that there is lots of good mineral on that creek, and how could it be otherwise when it is surrounded by mineral. Some placer mines have been discovered and located on the Rio Chiquito, by prospectors from Leadville in the last few days, and they think the creek will pay very well. The lode discovered on the head of the same creek runs away up into the hundreds, so I am informed by those who have seen the assay report. The Taos creek placer mines have been bonded for \$10,000, and parties are making preparations to work them on an extensive scale. Litz & Son have also bonDED their claim for a large amount, so I am reliably informed. I have seen some very flattering reports from the Picuris mines, as also from the Arroyo Honda.

Several parties are making arrangements to ship ore to Denver, and from the assays received, there is no doubt but that it will pay well. Developments of rich mineral are of almost daily occurrence here, and it is nothing, in my opinion, to what it will be in a short time. We are going to have a perfect stampede to this camp shortly. In my next I will give you some figures from assays of the different camps in this district.

The Kanchos of Taos is improving rapidly; it looks as though it would be the coming town in this valley and would be a good place for a smelter, as there is plenty of good ore in the immediate vicinity and good coaking coal to smelt with. A few good mechanics would do well here, a blacksmith and some carpenters.

## The Mohave Mines.

All the information which reaches us from these mines is of the most encouraging character. A new mill is being put up there. With this mill available we may count on bullion returns from the Mohave mines from this time forward. The mines extend for nine miles in one direction, and good prospects have been had along the entire ledge or series of ledges. Some of the ore is remarkably rich. Gold predominates, although it is believed that as depth is attained silver will become the chief metal. While a great portion of the ore is of a milling quality, there are strata that will require smelting. These mines are all, or nearly all, owned by Los Angeles people, whose capital and enterprise have developed them. They are located in a beautiful and picturesque locality, and have the great advantages of wood and water in abundance in their immediate vicinity.

There is a great mass of ore out on the dumps, so that when the mill is started it will have a supply to keep it going indefinitely. These mines have now been so thoroughly prospected, and the character of the ore has been so positively determined, that no reasonable doubt can be entertained either of their great value or permanency. The coming summer will witness great activity in their working, and a very large number of people will find employment in them. Indeed we may safely look for a very important camp or mining town to spring up there, and quite an extensive trade will then arise between our city and the Mohave district.

We see that the papers of San Bernardino are urging their Supervisors to improve the road across the mountains by way of the Cajon pass to these mines. They say that if this be not done, the Mohave miners will make connection between this city and their camp by way of a station near Ravenna, on the Southern Pacific railroad. We are told that there is little or no difficulty in reaching that station. It might be well for our merchants to look into this matter. If Mohave camp is to become, as it is believed it will, an important mining center, its trade is worth making some exertion to secure.—*Los Angeles Express*.

**NEW LAUNCH.**—At a recent meeting of the Polytechnic Club of the American Institute, the president, Mr. T. D. Stetson, gave some details of a very small steam launch just completed by the Herreshoff Manufacturing Co., of Bristol, R. I., for P. Lorillard, of New York, having a complete condensing compound engine, weighing only 175 lbs., rated as 8-horse power, and running with steam at 150 lbs. pressure from a Herreshoff coil boiler, with a grate 22 inches diameter. The cylinders are 2½ and 4 inches in diameter. Running without resistance this complex engine has made as high 1,150 revolutions per minute. The launch for which the engine was built is 30 ft. long and 5 ft. wide, with a planking entirely of mahogany and a lining of pine laid diagonally, fastened with brass screws. Weight of boat and machinery, 1,800 lbs. Her guarantee speed is nine miles.

## The Pacific Business College.

Readers have doubtless often noticed the handsome engraving of the Pacific Business College, which appears from time to time in our advertising columns, and would like to know more about the institution thus placed prominently before them. The Pacific Business College was the first established commercial school on this coast. Through its intrinsic merits it has gained a reputation for thoroughness and system second to no institution of the kind on the continent; and as a consequence, it enjoys a patronage not only from all parts of this coast, but from adjacent territories, Mexico and South America. The college is endorsed by the prominent business men of the country, by the leading journals, and by eminent educators generally. The proprietors—Professors W. E. Chamberlain, Jr., and T. A. Robinson—are so well and favorably known in educational circles throughout the coast, as being eminently fitted for these responsible positions they occupy, that they require no commendation from us. These gentlemen are ably supported in their work by a full corps of teachers thoroughly qualified for their respective duties.

The college is located at 320 Post street, opposite Union square, and occupies the entire upper story of the Red Men's building. The site is one of the most desirable in San Francisco, as it commands a splendid view of the city and its environs, and is convenient to this leading thoroughfare, while sufficiently removed from their bustle and excitement. Union square is one of the most attractive and picturesque breathing spots in the city.

## Courses of Study.

These have been specially prepared to meet the requirements of business life; and no person of ordinary ability and application can complete a course of instruction in the Pacific Business College without becoming well qualified for the practical duties to which the studies pursued refer. The courses of study, and methods of imparting instruction are thorough and practical, and fully up with the demands of the age. The system pursued is peculiar to this college, and is well calculated to accomplish the desired results.

The commercial course is thorough and comprehensive. A system of actual business is employed, combining theory and practice in the most perfect manner, and is at once so simple and natural that it needs only an examination of its merits to convince the most skeptical of its superiority over all other systems. Book-keeping by both double and single entry as applied to all kinds of business, penmanship, commercial calculations, business correspondence, business forms, wholesale and retail merchandising, commission and forwarding, etc., etc. Commercial law, political economy, business ethics and other subjects of interest receive that attention which their importance demands. The student buys, sells, ships, consigns, discounts, insures, draws checks, notes and drafts, etc., and goes through the entire routine of actual business. There is in active operation a banking house, with checks, drafts, notes, bills of exchange, certificates of deposit, etc., fully illustrating the banking business. Students receive while attending this school the same practice in conducting business affairs that they would in a bona fide bank, office or counting house.

The telegraphic course is unsurpassed, and includes everything requisite to make students proficient operators.

The academic course is designed to give regular and systematic training in ordinary English and advanced mathematical branches, and to prepare those who need elementary education to enter upon the commercial course with a better foundation, and with more certainty of success. It furnishes thorough instruction in spelling, reading, arithmetic, penmanship, English grammar, letter writing, rhetoric, etc., also in algebra, geometry, mensuration, surveying, navigation, etc., including the differential and integral calculus. Students can make arrangements for studying the modern languages or other special branches; and they have the privilege of combining the studies of the different courses on very reasonable terms.

## Individual Instruction.

In the business course the class system is entirely discarded. Students receive such individual instruction in the several departments as enables them to pursue their studies as rapidly as their ability will admit. No student, therefore, is kept back in his course by those of less ability and application. On the contrary, he is always advanced as rapidly as is compatible with thoroughness. Ladies are admitted into all the departments of the college, and have in every respect the same advantages as the other sex. The tendency of the age is to remove all obstacles that have hitherto prevented women from competing with men in the different professions and industries. One of these disabilities is found in the fact that girls have not been properly educated for the practical duties of life.

These are some of the leading points of this institution. There is much other information of importance which can be gained from the publications of the college, which can be had by addressing the proprietors at 320 Post street, San Francisco.

The Merrifield mine, Nevada county, is having its stamps increased from 20 to 40.



## THE ENGINEER.

## The Future of American Railroads.

An English journal speaks as follows of the future of railroads in the United States: There are two powerful influences at work which certainly seem to show that American railroads have entered upon a new era in their history. Immigration into the United States is now taking place upon such an extensive scale that the Republic is being occupied and developed with a rapidity which would have been pronounced impossible and fabulous 20 or 30 years since. With the help of emigration from Europe and with the natural excess of births over deaths, it does not appear too much to assume that the population of the Great Republic, which now stands at about 50,000,000, will be carried, by 1890, to 62,000,000. In other words, we may estimate the average growth of the population of the United States during the next ten years at 1,200,000 per annum. It is almost difficult to over-calculate the effects which the efforts of 12,000,000 new inhabitants will exert upon the United States between 1880 and 1890. Villages will become towns, towns will expand into capitals, and wildernesses will be made populous. We must bear in mind that during the next decade there will be not only a growth of human power in the United States, but that there will be a development of steam power as well. The effect of all this will be marvelous.

Another circumstance which is exerting just now a very great influence upon American commerce and American railroads is the decline in the value of money to a more reasonable level. American have not been slow to profit from the cheapness of money in Europe; it may be said, indeed, that they have assisted to produce that cheapness. Ten years since the United States Treasury had considerable difficulty in floating 5% bonds of the Republic; but now, in consequence of the growth of American wealth and credit, and the remarkably low rates current for capital on this side of the Atlantic, the American Government can raise all the funds of which it may stand in need at 3½% to 4% per annum. The best of the American State Governments are also beginning to howl at 4½% per annum, or 5% per annum, and 5% per annum is becoming an outside rate in connection with new bonds issued by American railroad companies. The effect of all this upon the work of American railroad construction and upon American enterprise generally, must necessarily be very great and very encouraging.

## Impromptu Ingenuity.

Ready tact and ingenuity is sometimes of more value, especially in an emergency, than mere mechanical skill. As an instance to point the following may be cited:

Some years ago, a Spanish steamer, while crossing the Bay of Biscay in a severe storm, gave such indications, by an unusual noise at the stern, that there was something wrong with the screw propeller or its shaft outside of the ship—that is, the open space between the stern and rudder posts where the screw revolves. There was no dry dock in any of the ports on the coast where the ship could go to be examined; and on arrival at Vigo it appeared as if there was no alternative but to remove the cargo from the stern, and by placing it forward thus lift the screw propeller and shaft to the surface of the water. The alternative, simple as it was, meant a serious delay and great expense.

Before commencing to remove the cargo, another consultation was held. It was then decided to put the stern of the ship over a bed of light colored sand; and as the water was very clear, there might be a possibility of ascertaining the extent or cause of the mishap. For two days after the vessel was so placed, the wind caused a ripple on the water, which effectually prevented anything being seen. It was then suggested by some one on board to try the use of oil on the surface of the water round the stern of the ship. The effect was most satisfactory. The water was hecalmed as if by magic, and it was then seen that the wedge or key which keeps the propeller in its place on the shaft had come partly out, and thus left the screw loose on the shaft, which caused the noise. By continuing the use of oil for a few hours the wedge was ultimately driven into its place and secured. Many days of detention, and the use of costly appliances and labor were thus saved.

A HOME COMPLIMENT.—The recent appointment of N. W. Spaulding, of Oakland, as U. S. Assistant Treasurer, vice Wm. Sherman, will give general satisfaction to the people of California. Few of our citizens are more widely known and respected. When he took an active interest in the politics of Oakland he was repeatedly elected Mayor, and was a vigilant and conscientious official. As a member of the Council, his name will always be associated with some of the most important local measures. He was the father of the present complete system of Oakland's street improvements, and by its adoption, that city has saved millions of dollars. In any capacity in which he has ever served he has won the admiration and esteem of those who knew him best, and thousands will be glad to learn that he has now received one of the most prominent Federal appointments on the Pacific coast.—*Alameda Encinal.*

## USEFUL INFORMATION.

## A New Substitute for Rubber.

In this early future india rubber ought not to be an expensive article. In addition to two or three new plants from which the same or a similar substance may be derived, we now have an artificial substitute, which is practically unlimited in supply. The new substance is not quite so tough or elastic as gutta-percha, but it resists an equally high pressure at temperature, and is especially applicable as a perfect and durable insulator of wires for electrical purposes and for many other uses. It is prepared in the following manner:

A quantity of coal tar oil or equal parts of coal and wood tar oil, which is to constitute a third part of the whole mixture, is poured into a large kettle, together with an equal quantity of hemp oil, and is heated for several hours, either over steam or an open fire, to a temperature which lies between 252° and 258° Fahr. (it should not exceed the latter), until the mass becomes so ductile that it can be drawn in long threads, and the remaining third, consisting of a quantity of linseed oil, which has been thickened by boiling, is then added.

With this composition, from 5% to 10% of ozokerite and some spermaceti should be mixed. The mass is then again heated for some hours at the same temperature as above, and finally from 7% to 12% of sulphur is added. The mixture thus obtained is cast into forms, and treated the same as gutta-percha.

The proportions of the three oils may be slightly varied according to the practical purposes for which the composition is to be used.

CHEESE MADE FROM POTATOES.—A foreign paper says that cheese is made from potatoes in Thuringia and Saxony. After having collected a quantity of potatoes of good quality, giving the preference to a new white kind, they are holed in a caldron, and after becoming cool, they are reduced to a pulp, either by means of a grater or mortar. To five lbs. of this pulp, which ought to be as equal as possible, is added one pint of sour milk and the necessary quantities of salt. The whole is kneaded together, and the mixture covered up, and all is to lie for three or four days according to the season. At the end of this time it is kneaded anew, and the cheeses are placed in little baskets, when the superfluous moisture escapes. They are then allowed to dry in the shade, and placed in layers in large vessels, where they must remain for 15 days. The older these cheeses are, the more the quality improves. Three kinds are made. The first and most common is made as detailed above; the second, with four parts potatoes and two parts of curdled milk; third, with two parts of potatoes and four parts of cow or ewe milk. These cheese have this advantage over other kind—do not engender worms; and they keep fresh for a number of years, provided they are placed in a dry situation and in well-cleaned vessels.

AMBER VARNISH.—The following is an improved method of making this varnish: Take of white resin one lb., melt it in a clean glazed pipkin, then put with it two ounces of pale amber (finely powdered), little by little, stirring it with a small stick over a gentle fire until dissolved, and pouring in now and then a little oil of turpentine when you find it beginning to grow stiff; continue to do so till the amber is melted. Great care must be taken that you do not set it on fire, for the very vapor of turpentine will take fire by heat only; but if it should happen to get on fire, cover the vessel close with a flat board or wet blanket, and the air being kept from it, it will go out. It will be best to melt the resin in a cylindrical glass, in a bed of hot sand, after the glass has been well annealed or warmed by degrees in the sand bath, under which you must keep a gentle fire. When the varnish is made, pour it into a coarse linen bag, and press it between two hot boards of oak or iron.

SOLIDIFIED OIL.—A new article of manufacture has recently been introduced in England in the form of "solidified oil" for lubricating purposes. This new substance is said to possess some valuable and special characteristics. Although solid, the oil is soft and to a large extent unaffected by cold or heat. It does not become fluid until the temperature to which it is exposed reaches 212° F., the boiling point of water; and it can be made to reach a still higher melting point if required. It contains no acid, and leaves no deposit in steam cylinders. When passed into the feed water, through the exhaust pipe, it has the effect of preventing incrustation in steam boilers. It neither gums nor clogs on exposure to air or heat. It is applicable to all purposes where tallow can be used, and, weight for weight, will last four times as long and is three times as economical. It is said to possess considerable power of cohesion, which renders it peculiarly well fitted for perpendicular surfaces.

TO POLISH BRASS.—Pulverize a sufficient quantity of sal-ammoniac very finely and moisten it with soft water; rub the paste on the brass, which should be warmed meanwhile over some clear coals of wood; then rub dry with a soft leather, dusted with a mixture of bran and Spanish white. Another method is to wash the brass with a solution of one ounce of alum holed in a pint of strong wood-ash lye; when dry, polish with fine tripoli on a soft chamois leather.

HORSEHIDE BELT LACING.—A correspondent of the *American Machinist* describes a very durable belt lacing which was made as follows: A dry, untanned horsehide was soaked in water until soft enough to cut, and then cut into strips. These were made soft and pliable far sewing by "sawing" them over a square cornered iron. The belt was then sewed with the hair side inward the first time across, and outward on the finish, so that the hair took all the wear. After the strip had dried it was as solid as any hooks, with the advantage that it could not unhook. It wore remarkably well, and did not eat the belt holes.

NEW VARNISH.—Fr. Theis, of Biesendorf, prepares a varnish consisting of 100 parts of resin, 20 parts of crystallized carbonate of soda and 50 parts of water; by heating these substances together and mixing them with a solution of 24 parts of strong liquor ammonia in 250 parts of water. With the mass thus obtained the pigments are levigated without the addition of linseed oil or turpentine; the paint dries readily without the aid of a drier and looks very well, especially when varnished. The paint keeps well, even under water, and becomes very hard. The cost is said to be about one-third that of ordinary oil paints.

CHEAP PAINT.—Three hundred parts washed and sieved white sand, 40 parts of precipitated chalk, 50 parts of resin, and four parts of linseed oil are mixed and boiled in an iron kettle, and then one part of oxide of copper and one part of sulphuric acid are added. This mass is applied with an ordinary paint brush while warm. If too thick, it is diluted with linseed oil. This paint dries rapidly and gets very hard, but protects woodwork excellently.

NEW LUBRICANTS.—K. Drechsler mixes graphite thoroughly with the whites or yolks of eggs, dries the mixture, pulverizes it and scatters it upon the parts of machinery which move slowly. G. Lieckfeld mixes graphite with soluble glass, so as to make a stiff broth. The mass is spread upon worn surfaces, where it soon hardens and can be filed or turned, so as to restore the machinery to its original perfection.

## GOOD HEALTH.

## Remedy for Burns and Bee-Stings.

EDITORS PRESS:—Dry wheat flour, if applied immediately to a burn, relieves pain and prevents a blister forming.

Common fine salt dampened a little, and put upon the wound made by a bee stops pain and swelling immediately.—*Mrs. I. L. M.*

THE PHYSIOLOGY OF WALKING.—From a summary given by the London *Lancet* of the manner in which M. Marey has investigated some points in the physiology of walking, we extract: "Some time ago he devised an apparatus for registering the steps, which he has called an *odograph*. It consists of a small cylinder, rotating by means of clock-work in its interior; and of a pen which marks on the cylinder, and is raised at each step by an impulse communicated by a ball of air beneath the sole. Observations have been made on a number of soldiers. It was ascertained that the step is longer in going up hill than in going down hill. It is shorter when a burden is carried; longer with low than with high-heeled boots; longer when the sole is thick and prolonged a little beyond the foot, than when it is short and flexible. It thus appears that the heel may with benefit be almost indefinitely lowered; while it is disadvantageous to prolong the sole of the boot beyond a certain limit, or to give it an absolute rigidity. Some influences which lengthen the step lessen its frequency; so in going up hill, the step becomes at the same time longer and less frequent. In walking on level ground, the length of the step and its frequency are always proportioned; the quicker the walk the longer the step."

THE RESULT OF SWALLOWING TEETH.—A Miss Cole, of Middletown, Orange county, N. Y., on the 5th of January, 1869, swallowed a new set of false teeth, which became separated from the rubber mold in which they had been set while masticating her food. Before she could eject the food from her mouth the teeth had gone down into her stomach. The family physician was summoned, but all his efforts were unavailing. The teeth caused her no discomfort, and in a short time the matter was entirely forgotten. A few days ago, says the local paper, Miss Cole, the lady in question, felt a sharp pain near her left shoulder, and on examining the spot found what appeared like a wen under the skin. With the aid of a pen-knife she extracted a hard substance which proved to be a tooth. She was at a loss to know how the tooth came to be in such an unusual spot until she suddenly recollected that she had, 12 years ago, swallowed her set of teeth. During the past few days the lady has been cutting teeth all over her body, and had at last accounts recovered 12 of the 14 teeth that had formerly constituted her full set. She is anxiously awaiting the arrival of the other two. She has placed the teeth in a glass case, and will keep them as mementoes.

## Practical Knowledge.

This world little imagines how largely it is indebted to the laborious researches of scientific medical men for many of the most important truths relative to human health, happiness and life. As population increases, and the value of food is enhanced, the knowledge which chemistry has elicited is becoming more and more valuable in a practical point of view.

"How much ability to labor can I derive from eating a pound of potatoes, or a dollar's worth of brandy, beer or gin?" are items which could be turned to large account by multitudes of the toiling poor.

Some kinds of food are more nutritious than others, and if it should be found that articles which are cheapest, have most nutriment, and give the highest ability to labor, then knowledge becomes money to the poor. Tables vary, but some of the general results are as follows: One lb. of rice, prepared for the table, gives 88% of nutriment, and consequently, a relatively proportional ability to labor, compared with other articles of food. A pound of beef, costing 15 cents, gives only 26% of nutriment. According to these estimates, therefore, rice as an article of food, is 100% cheaper, 100% more valuable to the common laborer, than roast beef, yet countless numbers of the poor in New York strain a point daily to purchase beef at 15 cents a pound, when they could get a pound of rice for one-third of the amount, the rice, too, having three times as much nutriment as the beef, making a practical difference of 600%, aside from the fact that boiled rice is three times easier of digestion than roast beef, the rice being digested in about one hour, roast beef requiring three hours and a half. There is meaning, then, in the reputed fact, that two-fifths of the human family live mainly on rice. We compile, therefore, the following tables for preservation, as being practically and permanently useful. All the economist requires, is to compare the price of a pound of food, with the amount of nutriment which it affords.

KIND OF FOOD.	MODE OF PREPARATION.	PERCENTAGE OF NUTRIMENT.
Oils.....	raw.....	95
Peas.....	boiled.....	83
Barley.....	boiled.....	92
Corn bread.....	baked.....	91
Wheat bread.....	baked.....	90
Rice.....	boiled.....	88
Beans.....	boiled.....	87
Rye bread.....	baked.....	79
Oatmeal.....	porridge.....	74
Mutton.....	broiled.....	50
Plums.....	raw.....	29
Grapes.....	raw.....	27
Beef.....	raw.....	26
Poultry.....	roast.....	26
Pork.....	roast.....	24
Veal.....	fried.....	24
Veal.....	broiled.....	22
Cod fish.....	boiled.....	21
Eggs.....	whipped.....	13
Apples.....	raw.....	10
Milk.....	raw.....	7
Turnips.....	boiled.....	4
Melons.....	raw.....	3
Cucumbers.....	raw.....	2

—*Journal of Health.*

TOBACCO SMOKING BY CHILDREN.—If we are willing to accept the opinions which sanitarians in other nations have formed, we have a very decided one ready to our hand in Switzerland. That intelligent republic enacted a law, last year, prohibiting the sale of tobacco to minors under 15 years of age, and making it an offense against the law for such to smoke. Hence a boy of 12 or 14 who parades the streets of Geneva or Berne with a cigar in his mouth is liable to be arrested and committed to the police station; and, as they have a disagreeable habit in that republic of enforcing the laws they enact, such would be pretty certain to be the juvenile smoker's fate. We recommend to our fellow countrymen their manner of dealing with the habit, which, whether harmless or not to most adults, is unquestionably of great injury to young boys.—*Med. and Surg. Reporter.*

HEALTHFULNESS OF BUTCHERS.—The proverbial freshness and healthfulness of butchers is well known and has been attributed to the fact that they absorb, by assimilation through the respiratory passages, the nutritive and vitalizing principles of the meat volatilized in the air, for it is a generally observed fact that butchers have small appetites and do not eat much meat. Assuming this to be the true explanation, it is argued that young people suffering from deficient or impure blood, and especially children of a weak or lymphatic constitution, might be subjected with advantage to hygienic treatment based upon it. A French physician of eminence commends the idea, and offers a plan for a kind of gaseous baths for patients, the air to be charged with vapors of the appropriate vitalizing principles, and thus, he thinks, arrest the progress of tuberculation.

SALICYLATE OF SODA IN RHEUMATISM.—In regard to the use of salicylate of soda in rheumatism, Dr. Bouloumie communicates to the Paris Academy of Medicine, some of the results of his recent investigations. His more important conclusions are, that it is in the case of young men—patients who have not before undergone attacks of gout, or who do not present any tendency to nervous depression—that the salicylate may be used without danger; second, that it acts chiefly by deadening pain; third, that in thus treating acute articular rheumatism in children the salicylate is perfectly well borne by them, even in a daily dose of six grams.





W. B. EWER..... SENIOR EDITOR.

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#### SAN FRANCISCO:

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#### Passing Events.

Probably the most interesting item of mining news of the week is the strike in the Bald Mountain Extension claim at Forest City. They took over several hundred dollars worth of coarse gold where they struck the channel. It is said to be now the general opinion in the vicinity that the extension is really a part of the Old Luc Yankee lead, that yielded hundreds of thousands of dollars in dividends some years ago.

The trouble between the Mechanics' Union and the mining companies at Cherry Creek, White Pine county, has been settled. A public meeting being called, and a majority of the citizens voting that the Union was not justified in asking the raise of wages named by them, the Union acquiesced in that opinion, and all of them went back to work at the old rates. None of the men who participated in the strike were discharged. Everything is running as usual at the mines and mills.

The Richmond vs. Albion suit has been closed at Eureka, and the court has reserved the decision, which will be filed in writing before May 15th.

Parties are starting from every direction for Wood River. In all our exchanges we see notices of the departure of prospectors. In all probability the country will be crowded, as is usually the case where there is an excitement of this kind. Prospecting has begun and men are pushing their way into the hills as fast as the snow recedes. The tide of population is beginning to move from Bellevue to Ketchum. Ground is graded for a new smelter, and a water-ditch is being built. The companies along the river have begun work in earnest on their mines in many places. The great majority, however, will be compelled to wait a little longer before they can begin active operations. We hear of parties being made up for Alaska mines, some of them going up the coast in vessels of their own.

#### Foundry Notes.

##### Copper Furnaces.

A noticeable feature just now is the number of copper mines coming to the front, there being quite a stir in that metal at present. The utilization of smelting ores of other kinds is also noticeable. Several new districts in Arizona and the Wood River region, Idaho, where smelting ores abound, are attracting notice and furnace construction is looking up.

The Pacific Iron Works in this city are engaged in making a number of smelting furnaces, and having had large experience in that line, now make a type of furnace which is ready to put in use on arrival, no brick work being required.

They have just shipped a 30-ton copper furnace to the Huachuca Copper Co., in Silver Bell district, Arizona. Are now completing another 30-ton copper furnace for the Copper Queen, at Bisbee, Arizona, which mine has, by the way, been sold for \$1,200,000 within the past few weeks. This shows what a really good copper property is worth. The works are also making a 30-ton copper furnace for the Reward Co., at Genesee valley, Butte county.

They have lately shipped a Howell furnace and equipment for roasting mill, to the Ventanitas mining company of Mexico, and sent a furnace and drier to another Mexican mine near Alamos.

A shipment was made last week of a lot of machinery to the Etna mine, at Galena, Nevada, for refitting the mill. Refitting work is also being sent to Lewiston, Idaho. A number of settlers, amalgamating pans, etc., have been sent recently from these works to the Shielde mill, Colorado. Three sets of double hoisting works have been delivered to as many mines at Butte, Montana. Quite a number of these hoists are being built, of the type we recently illustrated in this journal.

##### Concentrators.

Millie B. Dodge has delivered several of his patent concentrators this month. Two of these have been sent to Oregon. Two more are in the hands of Mr. Eames, at Tuttle town, Tuolumne county. Two have been sent to Mr. M. H. Sunderland, at Coarse Gold Gulch, Fresno county. One has been sent to New York for use at the sampling works of Kunstel, Riotta and Mather. Mr. Hoffman, of this city, has also purchased one. These concentrators, as well as the Dodge rock breakers, are made under Mr. Dodge's personal supervision, at the Empire iron works. About a dozen of the rock breakers were shipped this month, and a number more are being made. The rock breaker is an old and well-tried implement, and the concentrator is also proving itself a practical and useful appliance.

#### California's Position.

An encouraging item of news is that to the effect that the Free Labor Exchange, of this city, will be closed this week, there being no longer necessity of maintaining it. The demand for labor is now about equal to the supply, and there is work for all who want it. This, in this city, where the railroads and steamship lines center, speaks well for the business of the interior, for it is from here the interior draws its laborers. The surplus population of the city seems to have gone away, probably being forced into channels of labor outside of the influences of the city.

Although we cannot say that many new manufacturing enterprises have of late been inaugurated in San Francisco, it is nevertheless the fact that most of those already established are in a flourishing condition. Within the past few weeks we have had occasion to call at a number of manufacturing establishments and in each case we have found preparations being made or under way for an increase of facilities. The proprietors all speak encouragingly of the future, and by no means have any fears of San Francisco losing her commercial prestige.

In the interior of this State, more especially in the mining region, matters look more encouraging than for many years. Numerous old mines are being opened again, and many new ones are being worked. There seems to be more of a general disposition to thrift than formerly. Miners getting hold of a claim work it legitimately for their own benefit, and do not squander their earnings as used to be the fashion. The agricultural regions of the State are also prosperous. In fact, none of us in California have any cause of complaint. We are favored with good climate and abundant natural resources ready for development. Somewhat extravagant notions imbibed from pioneer practices, and tricks of politicians, have made dull times for a while, but we are fast working out of this and will soon be fairly on our feet again. The change in the labor market is a first-rate sign of healthy commercial vigor.

A REPORT comes to us through a gentleman from Benton, says the *Emerald Herald*, that the superintendent of the Diana mine recently reduced the wages of miners at that mine from \$4 to \$3.50 and \$3 to \$2.50 for underground work and \$3 for top hands. There was talk among the miners of a strike.

It is proposed to add 40 stamps to the Father de Smet mill, making it 120 stamps.

#### High Explosives.

[Written expressly for the MINING AND SCIENTIFIC PRESS, by M. ESSLER, Chemist.]  
Number Four.

##### Nitro-Glycerine.

At G. M. Mowhrey's factory, near North Adams, in Massachusetts, the nitrication of the glycerine takes place in stoneware jars; 116 of these are distributed over nine wooden troughs, which latter are filled to within a few inches from the top of the jars with ice-cold water, or a mixture of ice and salt. Each jar receives 17 lbs. of acid mixture, and into this 1 lb. of glycerine is introduced, drop by drop, from glass vessels, which are placed on a shelf just above the acid jars. Below this shelf runs an iron tube, about 1½ inch diameter, through which cold, dry air is conducted; from this tube glass pipes branch off, joined by means of india rubber tubes, into each jar, which thus receives during the dropping of the glycerine, a constant current of cold air, acting both as cooler and as stirrer. Very beneficial influence is ascribed to this air current, which oxidizes also nitrous acid vapors.

The introduction of the glycerine into the acid must be finished within one and a half hour; there should be no rise of temperature, and certainly no appearance of red vapors. After the transformation of the glycerine, the jars are emptied into troughs containing water of 70° F.; the nitro-glycerine sinks to the bottom and remains covered with about six feet of water, for a quarter of an hour, when first the water is drawn off from above, then the nitro-glycerine from below. The latter is transferred to oscillating casks in which it is washed three times with water, and twice with soda solution, a current of air passing through the liquid all the time. The wash waters pass into a tub, from thence into two casks, sunk into the ground, where such nitro-glycerine as had been carried away by the water is retained. (The writer considers Mowhrey's plan very good and strongly recommends some of its features to the consideration of nitro-glycerine manufacturers.)

The nitro-glycerine is carried in copper vessels to a shed, about 100 yards distant, and poured into stoneware jars (the writer objects to the employment of stone, porcelain, or such like ware for handling made nitro-glycerine; he would recommend vessels of india rubber or paper, or something which does not break or leak), of 60 lbs. contents, and the jars placed in reservoirs filled with water of 70° F., and left here three days. Impurities rise to the surface, and are skimmed off.

The nitro-glycerine is now ready for commerce. It is filled in canisters of galvanized sheet iron, coated inside with paraffine and capable of holding 56 lbs.; the floor of the shed where the filling takes place is covered with a thick layer of calcined plaster of Paris, in order that any spilled nitro-glycerine be absorbed at once. The canisters are then exposed to the cold of ice and salt for the sake of freezing their contents; in this state they are stored, 30 to 40 to a hatch, in magazines at least 100 yards from all the other buildings of the factory. The transport of this nitro-glycerine takes place also while it is frozen.

As the liquid nitro-glycerine does not enter to any extent into practical use on this coast, I will simply mention some of its

##### Properties.

Nitro-glycerine is an organic poison. It produces serious consequences when taken into the system—vertigo, weakening of sight, stupor, pains in the cardiac regions; in larger doses it acts like strychnine, being fatal when more than 10 grams are swallowed. Even mere contact with the skin produces serious symptoms, though workmen get used to it after a time. In external contact, the nitro-glycerine may be of serious consequences if it is taken into the blood; so workmen, if they have sores or wounds on their hands, must be extremely cautious in handling it.

At ordinary temperatures it is an oily liquid, clear, colorless or yellowish, refracting light, of sweetish and burning taste, without odor, of 1.6 specific gravity; it solidifies at a comparatively high temperature, 40° F. In water it is insoluble, but dissolves easily in ether, wood spirit, benzole, chloroform and hot alcohol.

Pure nitro-glycerine does not decompose spontaneously at ordinary temperatures; up to 120° F. its loss is hardly perceptible by evaporation; by gradual heating in enclosed vessels up to 212° F. it can be kept in that state for several days without explosion; if the heating is continued gradually and slowly up to 400° F. it commences to decompose and loses its explosive properties. A sudden and quick heating to 330° F. will explode it. The gases resulting from the explosion are: carbonic acid, water vapors, nitrogen and oxygen and combinations of the latter two elements.

Theoretically the explosive force of nitro-glycerine as compared with gun powder is stated to be as 1 to 10, but in practice this figure is much lower and different experimenters give different opinions. Putting a light directly to nitro-glycerine does not lead to detonation, but it is very dangerous to set fire to it, as in bulk the fire may heat the mass to its exploding temperature and lead to disastrous results. Some writers assert there is no danger if any amount of nitro-glycerine is set on fire; they say it will burn away quietly long before it is heated to the degree at which it explodes.

If heated in a closed space it explodes violently.

If it is exposed for some time to a strong heat, like in a tropical climate, it becomes very sensitive, owing to a partial decomposition; then any concussion, increase of temperature, or strong vibration in the air will explode it.

Electricity will explode it. By putting the two poles of an electric battery into the fluid and passing the sparks between them for some seconds, the surface of the nitro-glycerine becomes agitated, turns black, and then it explodes.

Mr. Ahel says: That nitro-glycerine explodes by electricity or any other influence which produces heat; only then, when the intensity of the same or the time during which the same acts, is sufficient to produce a decomposition of a portion of the liquid, and if this decomposition has once commenced, the temperature rises by accumulation of heat to such a point as to cause its explosion.

Nitro-glycerine explodes by a blow or concussion, but gradually increasing pressure is unable to explode the liquid, but if a blow is given to it with sufficient vehemence and quickness, so that the force of the stroke will produce a sufficient heating point, then the particles struck will explode.

At about 32° F., nitro-glycerine becomes solid, and when exposed to that temperature for some time it becomes a hard substance. In this condition it is hard to explode, even with the fulminates (caps). Although in a frozen condition this substance is considered much safer than in its liquid state, it has still to be treated with due precaution.

Several accidents are on record where, in Europe, the frozen stuff was broken with a pick, and these accidents have proven that, although frozen nitro-glycerine is hard to explode with a cap, it will nevertheless explode easily when struck heavily with a sharp-pointed instrument. For instance, take a pick with a sharp point of 10 lbs. weight and strike it against a hard rock with a velocity of 20 ft. per second, and if there is any nitro-glycerine at the point of contact, this blow will exceed by far in intensity the concussion produced by an exploding triple-force cap and consequently detonate the nitro-glycerine.

#### Precipitants for Gold.

In the leaching of ores, when the ore contains copper, Mr. Aaron says the waste solution from the tanks in which the copper is precipitated can be used for refilling the vat containing the precipitant for gold, as it contains a large quantity of iron proto-salts, chloride and sulphate. The strength must be reinforced with copperas, or acid and iron. The waste liquor from the chlorine generator, consisting partly of manganese proto-sulphate, is also a good precipitant for gold. In order to utilize as much as possible of the chlorine which it contains, as well as any free acid which may be present, it should be placed in a covered tub, or small vat, with some scrap iron. In a day or two the chlorine and the acid will be saturated with iron, thus forming an additional quantity of precipitant.

Other precipitants which yield the gold in the metallic state are, oxalic acid, sulphurous acid, the antimony, arsenic, and copper lower chlorides, and animal charcoal. The latter is used as a filter on which the gold solution is poured, when the particles of carbon become covered with a film of gold. It is patented. In some European works the gold is, or was, thrown down as a sulphide, by means of hydrogen sulphide. This method has the disadvantage of precipitating also copper and some other metals if present.

**BRITISH COLUMBIA MINES.**—The *Colonist* correspondent at Takou, B. C., writes despairingly from the new mines. He says the excitement about the Takou mine is gradually subsiding, and none of the old miners have much confidence in it. About 70 or 80 men are reported to be on the spot, but as the ice has not yet got out of the ground, very little has been done. The quartz-bearing vein is said to be very thin; and as it is not expected that surface diggings will be found, there is little or no inducement for single men without capital to visit that far-off place. Several traders and miners have taken up claims at Takou, intending to resume their business there. The present aspect of things, however, is not sufficiently encouraging for them to do so for a time; therefore they will remain at Vangor or return to their old locations at Cassiar.

**SUGGESTIVE.**—We take the following from the *Placer Miner* of the 21st: We are informed there is a disappointment in the Dewey mine with the Chinese miners. They do not seem to understand drift mining as well as was thought, and it now takes three Chinamen to do the work of one good white miner, comparatively. The Dewey people seriously contemplate discharging the Chinamen and putting on white men again, so we understand. It will be remembered about six weeks ago some 30 white men were discharged and Chinamen put to work in their place in this mine. We suggested then it was a bad policy.

**WATER** for Candelaria is to be conducted from the White mountains, a distance of 23 miles. At present the dwellers in this camp pay 25 cents per gallon for drinking water, strongly impregnated with alkali. It costs \$2 to take a bath.



## The Brush Electric Light.

That the electric light is to be the principal illuminator in the future, few doubt. For street lighting purposes and for large manufacturing establishments it is particularly useful and is rapidly growing in favor. On this coast it is being introduced into quartz mills and among the hydraulic mines, and is daily attracting more and more attention. For this reason we feel sure our readers will be interested in the following description of the Brush electric lighting system, which we take from the *Scientific American*: The most difficult problems in electric lighting have been: (1). To provide an efficient and economical means of converting mechanical power into electric energy, that is, a good dynamo-electric machine. (2). To devise a generator able to evolve an electric current capable of subdivision, to supply a series of lamps in one circuit. (3). To invent a self-regulating lamp, adapted to such an electric circuit, and so constructed that any accidental disturbance of it, or its extinction, would have no effect upon the other lamps in the same circuit. The lamp to be at the same time easy to keep in order, durable and economical in power. (4). To discover an automatic method of regulating the supply of electricity so that the current would be always exactly equal to the varying requirements of the circuit. Up to 1876, when Mr. Brush produced his first dynamo-electric machine, a large number of scientific investigators and mechanical inventors had been at work upon these problems. Individually and together they had accomplished much, but there was yet no machine that could be considered a commercial success, and no lamp—certainly no system of electric lighting—that had passed beyond an experimentally promising stage. There was no machine that could furnish a current for a number of lamps, much less sustain them in one circuit with steadiness and uniformity. Very soon after Mr. Brush entered the field, he presented to the public an apparatus which was free from the defects of all other systems, and the public, waiting for just such an apparatus, welcomed the new machine, and the result is that to-day the Brush Electric Light is practically the sole occupant of the field; at least 49 out of every 50 lights that have been sold in this country being Brush lights. Up to the present time over 6,000 Brush lights have been sold for regular industrial use, and the business has only just opened. An idea of the great superiority of the Brush system of lighting may be obtained from the fact that with the largest sized Brush machine 40 powerful electric lights are burned in one circuit, with an absorption in the machine of 36 horse-power. We believe that no other system of lighting can maintain one-fifth this number of lights on one circuit; and most are confined to a single light to one machine. The genius of the inventor of this system, and the energy and good business management of the Brush Light Electric Company, of Cleveland, have done more since 1876 to place the business of illumination by the electric light upon a practical and substantial basis than has been done in this direction by all other inventors since the discovery by Faraday, at least so far as voltaic arc lights are concerned.

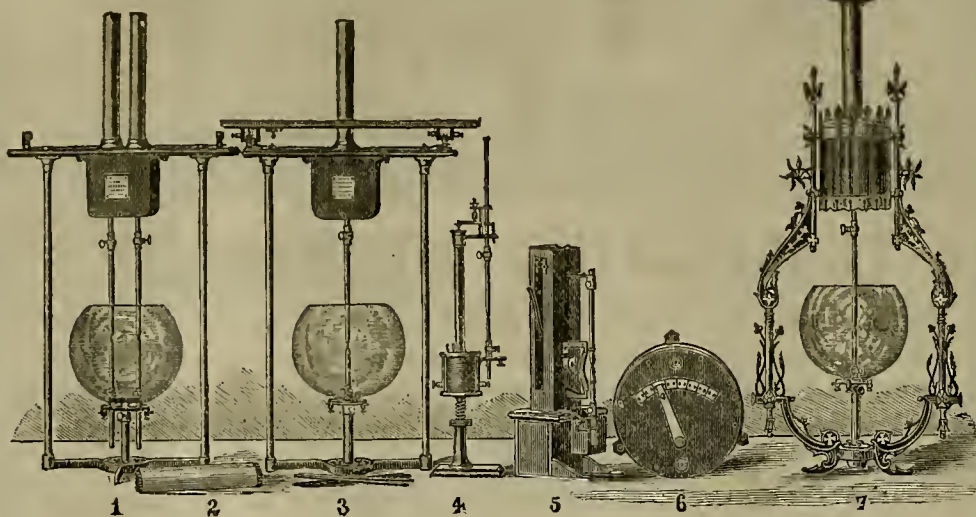
In every sense the Brush electric light is a practical, commercial success, and is no longer an experiment. No better proof of this could be required than the well known fact that no one can buy a Brush machine or lamp at less than regular prices. Makers of other machines may offer inducements of every kind, in the way of large discounts from regular prices, the privilege of a trial with no obligation to purchase, long deferred payments, etc.; but the Brush Company takes the same ground held by George H. Corliss in regard to engines, and claims that the apparatus they furnish is no longer experimental, that it is well worth the price asked for it, and should not be compared with merely experimental systems whose principal recommendations are that they can be bought at the purchaser's own price, and may be returned if not satisfactory.

Not only has the Brush light practically monopolized the field in this country, but, if we may judge from reports, it is also rapidly doing the same abroad. It has made wonderful advances in England, where it is controlled by the Anglo-American Brush Electric Light Corporation, (limited), having a capital of \$4,000,000. One year ago this company bought the English patents of Mr. Brush at a very large price, and

we understand they have recently purchased all his other foreign patents—those for France, Belgium, Austria, Russia, Italy, Spain, Norway, Sweden, Denmark, etc., paying for them still larger prices than they paid for the English patents, and they now propose to commence the introduction of the Brush light into all these countries in the same business-like and thorough manner which has characterized its management from the first. The sums paid for these foreign patents are, it is claimed, greater than have ever been paid for any other foreign patents obtained by an American. As rapidly as arrangements can be made the Brush light is being introduced into every civilized country on the globe, and it seems to have found a field in almost every branch of industry, and in almost every imaginable situation, as the following

out changing its speed or adjusting the lamps. Each lamp of the Brush type is provided with an automatic cut-out, which is one of the valuable features of the system. If a lamp in circuit becomes deranged so that its carbons do not feed together properly, or if the carbons need renewing, the cut-out mechanism is called into action and this particular lamp is switched out of circuit without disturbing any other lamp in use. When this lamp has been supplied with carbons again and put in order it will burn as before. This simple cut-out mechanism effectually guards against all the dangers of general extinction of lights, a thing liable to occur in all other systems. We believe that no other system uses a cut-out.

When it becomes desirable to operate lamps more than seven or eight hours continuously,

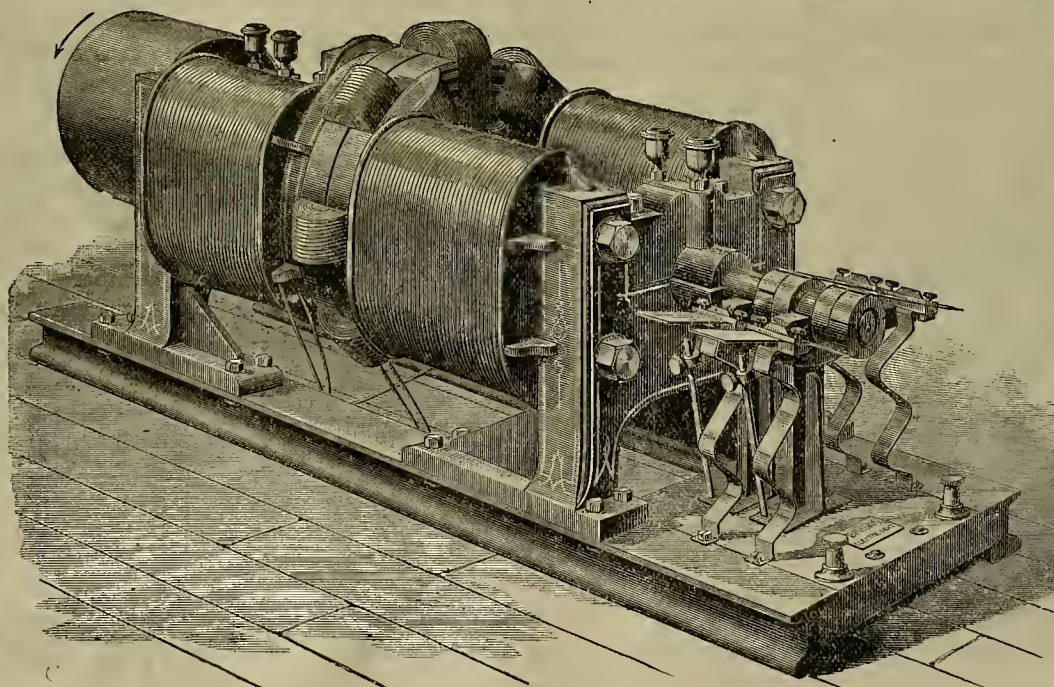


1. Double Lamp, 2. Carbons, 3. Single Lamp, 4. Focusing Lamp, 5. Head-light Lamp, 6. Dial Attachment, 7. Ornamental Lamp.

## BRUSH ELECTRIC LAMPS.

partial list of users indicates: There are 800 lights in rolling mills, steel works, shops, etc.; 1,240 lights in woolen, cotton, linen, silk and other factories; 425 lights in largest stores, hotels, churches, etc.; 250 lights in parks, docks and summer resorts; 275 lights in railroad depots and shops; 150 lights in mines, smelting works, etc.; 380 lights in factories and establishments of various kinds; 1,500 lights in lighting stations, for city lighting, etc.; 1,200 lights in

the double lamp shown in our illustration is used, and two sets of carbons are employed. Both carbon rods are actuated by a single magnet, the same as that employed in a single lamp, and they are so arranged that when one set of carbons is completely consumed, the other set is automatically switched into circuit. In practice the transfer of the voltaic arc from one set of carbons to the other is instantaneous and scarcely noticeable. By means of these



## BRUSH DYNAMO-ELECTRIC MACHINE.

England and other foreign countries. A total of over 6,000 lights which are actually sold, none of them being on trial.

This system, we believe, is the only one by which a large number of powerful electric lights can be burned in series, upon a single circuit of wire, with steadiness and uniformity. The machine known as No. 8 maintains 40 lights of 2,000 candle power each, upon a circuit 10 miles in length of copper wire No. 6, English gauge. By using still larger wire the distance or length of the circuit may be proportionately increased, it being possible to extend the circuit to 25 miles by using No. 1 wire. The smaller sizes of Brush machines are fully as efficient. A No. 7 machine is used in Montreal to light the harbor on a circuit of about three miles, using 16 lights. Another peculiarity and advantage possessed by the system is that any number of lights desired, from one up to the number capable of being maintained by the machine, can be burned in circuit from the machine with-

double lamps a system of lights may be maintained in continuous operation from 14 to 16 hours without requiring any attention, whereas other systems are limited to six or eight hours' continuous burning.

The great simplicity and durability of the machines are points of importance in considering the wear and tear from constant use. The experience of the four years shows that 1% allowance for wear and tear is ample to cover, and that with even a less amount annually spent upon the machines they will last indefinitely. The engravings show the generator and the various styles of lamp.

The business of the Brush light on Manhattan island is in the hands of the Brush Electric Illuminating Company of New York, a corporation organized under the laws of the State, with a capital of \$1,000,000. The officers are: W. L. Strong, President; A. D. Juilliard, Vice President; A. A. Hayes, Jr., Secretary; S. B. Sturges, Treasurer; C. M. Rowley, General

Manager; R. J. Sheehy, Superintendent. The first lighting station of the company is at Nos. 133 and 135 West 25th street. It contains at present five dynamo-electric machines, the largest of which is 89 inches long, 28 inches wide, and 36 inches in height, and weighs 4,800 pounds, and runs at a speed of about 700 revolutions per minute. It is believed to be the largest machine in the world. Forty lights are fed by it, and it requires 36 horse power. Several circuits are connected with this station, one exclusively for lighting parks and streets, Broadway, from 14th to 34th street, is lighted from there. Among buildings in this district are the Sixth Avenue Elevated railroad, the Sturtevant House, the Gilecy House, the Standard Theater, Daly's Theater, the Bijou Theater, the Aquarium, Aherle's Theater, Koster & Bial's, the *Herald* office, and many others. The company runs wires from this station to any point within a radius of two miles, putting up the light in any desired place, and renting in the same manner as is done with gas.

The street lighting is done by means of double lamps on iron posts 20 feet in height, and in plain glass globes. It is proposed to extend this materially and to use the larger lights, elevated on poles, for open spaces, as is now done in the West. This company has had much success in lighting large buildings for halls, such as the Academy of Music, Madison Square Garden, etc., using opal and lemon colored globes, giving a hue to the light which is approved by the fair sex. The establishment of lighting stations in cities and towns for the illumination of streets, parks, open spaces, depots, docks, stores, factories, etc., is enlisting very large amounts of capital, and promises to be a business as profitable and as eagerly sought after by capitalists as gas companies have been heretofore. Companies have already been formed, or are about to be formed, for the establishment of such lighting stations in the following cities

and towns: New York, Philadelphia, Boston, Baltimore, Washington, Providence, Albany, Hartford, New Haven, Meriden, Rochester, Buffalo, Cleveland, Cincinnati, Dayton, Indianapolis, Columbus, Middletown, Detroit, Grand Rapids, Chicago, St. Louis, Denver, Salt Lake City, Ogden, Butte, San Francisco, etc. It is only a question of a few months before similar companies will be formed, and similar lighting stations established in every city and town of any pretensions in the country. In all the above places the Brush light is to be exclusively used.

The general plan of operations in all these lighting stations will be similar to the one in New York, which, briefly described, is as follows: A location is first selected, as central as possible with reference to the territory to be lighted; sufficient space must be provided for engines, boilers, heater, pumps, shafting, belt-pulleys, etc.; space is also to be provided for dynamo-electric machines with the necessary wires and connections. As the steadiness and quality of the light are dependent entirely upon the steadiness of the power, care is taken to provide for this by the use of engines of approved make, with automatic cut-offs and other modern appliances for producing steady motion. The central station having been thus equipped, copper conducting wires are run from it on poles, on house tops, or underground, to the various points or places where light is needed.

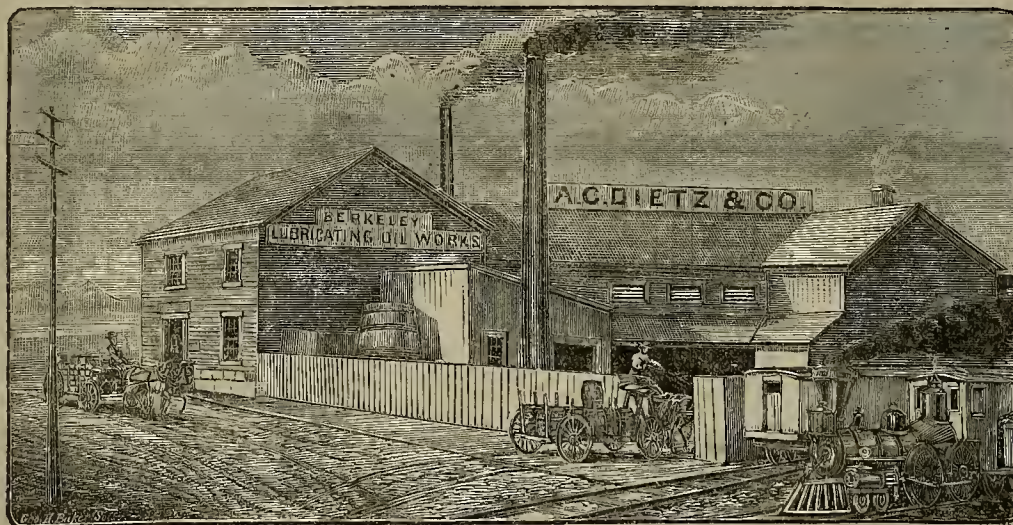
The light is furnished and charged for in proportion to the amount used, and this is readily ascertained by noting the consumption of carbons in the lamps, which is sufficiently uniform for this purpose.

When the engines in the lighting stations are started, the electric light machines are put in motion, and the electricity passes over the wires and produces a light in each lamp in circuit. An automatic governor or regulator is provided for each electric machine, and this is so constructed and so connected to the machine that, without changing the speed of the machine, any number of lights from one up to the number capable of being produced by the machine may be burned without any disturbance or interference, either in the machine or in the lamps. By means of this simple and admirable contrivance, any of the lamps in circuit may be turned off or turned on without increasing or diminishing the light in any of the other lamps in the circuit. From this description it will be evident that a lighting station of this character affords practically, all the facilities provided in the use of gas, for the electric lamp may be turned on and off at

(CONTINUED ON PAGE 284.)



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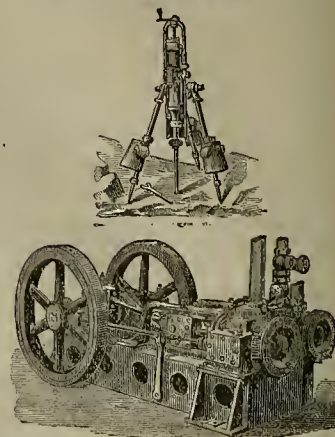
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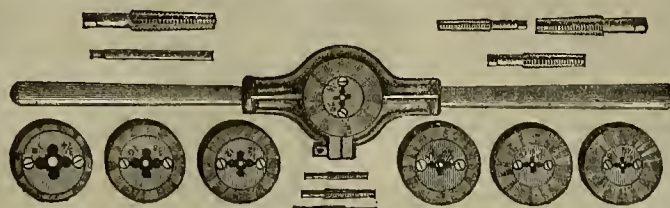
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will be worthy of generous support and encouragement. We  
therefore pledge our cordial sympathies, personally, and hope  
that the enterprise will receive kindly recognition and liberal  
support from all Architects and Builders and the public gen-  
erally. (Signed) David Farquharson, Wright & Sanders, S.  
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Banks, W. C. Hoagland, S. & J. Newsom, B. Henrickson

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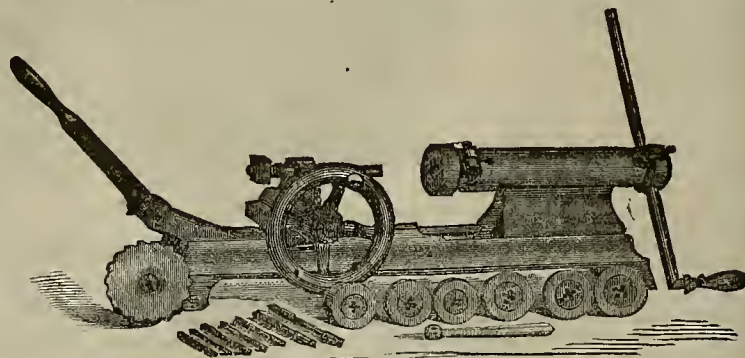
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Send for Circular.



## The O'Harra Chloridizing Furnace.

(CONTINUED FROM PAGE 273.)

hours in passing through the furnace, according to its character. Only one man is required to attend the fires, no other attention being necessary, as the ore may be fed to the hopper from the battery by any mechanical means.

By the peculiar construction of this furnace the inventor is enabled to feed and discharge the ore at the same end of the furnace. The battery and machinery being at this end of the furnace, the ore may be elevated and passed to the amalgamating appliances with very little trouble or expense of handling.

Two of these furnaces are in use at Potter & Hall's mill, Copper City, Cal., one for drying and one for chloridizing. The ore is of a very base nature, consisting of sulphide of copper, iron, antimony and other base metals. The average battery assays about \$16 per ton. By the use of the furnace they roast and mill from 40 to 45 tons per day, and obtain from 90% to 95% of the assay value. This is attested by the mill owners. About 40 tons a day are worked. The furnace costs very little for repairs. Both furnaces give entire satisfaction and do the work intended as near as any furnace can do.

At the Isabella mine, Silver Mountain, Alpine county, Cal., it roasts and chloridizes antimonial and arsenical sulphurets of silver from 84% up to 95% of assay. At the Washoe and Ophir tailings company's mill, Ophir, Washoe county, Nevada, a furnace of this style roasts the ore at a cost of \$1.50 per ton.

Those desirous of further information concerning this furnace may obtain it by addressing H. F. Whitney at Ophir, Washoe county, Nevada.

## Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

## DECISIONS OF THE U. S. COURTS.

## Tilghman vs. Proctor, et al.

Supreme Court of the United States.  
1. A patent for a process, irrespective of the particular mode or form of apparatus for carrying it into effect, is admissible under the laws of the United States.

2. To sustain a patent for a process the patentee should be the first and original inventor of the process, should claim it in his patent, and, if the means of carrying it out are not obvious to an ordinary mechanic skilled in the art, his specification should describe some mode of carrying it out which will produce a useful result.

3. If a subsequent inventor discover a new mode of carrying out a patented process, though he may have a patent for such a mode, he will not be entitled to use the process without the consent of the patentee thereof.

4. The decision in *Mitchell vs. Tilghman* (19 Wall, 237) reviewed and overruled, and *Tilghman's* patent, relating to the manufacture of fat acids, sustained as a patent for a process.

5. The decision in *O'Reilly vs. Morse* (15 How., 62), and in the case of *Nelson's* patent for the hot blast (Webster's report), commented upon and explained.

## Wicko, Appellant, vs. Ortrum.

Supreme Court of the United States.  
1. Elements which are well known in other connections may form a novel combination when brought together in a machine to produce a new result.

2. When the arrangement of the machine is such that the combination of all its several elements, or their mechanical equivalent, is necessary to its successful operation, claims to a limited number of these elements should fairly be construed to include the rest.

3. A claim for a combination is not infringed by the use of a limited number of its elements.

\* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

**A SINGULAR DISCOVERY.**—From Mr. George Madeira, who came over from La Porte, the *Pinmas National* learns that the miners running the pipes in the Gold Gravel or Conly claims, washed out, last Monday, a small coffin, containing the body of an infant, supposed by the physicians to be about seven months old. The body was in an air-tight tin coffin, enclosed in a wooden coffin, and had evidently been buried with care, and for the purpose of removal at some future time. The tin coffin had been filled with alcohol, and the body was in a splendid state of preservation and as natural as when alive. The top of the coffin was knocked off by the pipe and lost in the water, and the tin box looked as though it had been buried some 20 years. No one in La Porte, even among the oldest settlers, can remember anything regarding it. The ground is what was formerly known as "Aristocracy Ridge." The tin box was again filled with alcohol, soldered up and placed in a wooden box, when it was buried in the graveyard. If our exchanges copy this item it may catch the eye of some one interested in the matter, or one who can clear up the mystery surrounding it.

The liquefaction of ozone has recently been effected by M. P. Hautefeuille and J. Chappuis. The fluid is of a beautiful blue color. The liquefaction was accomplished by subjecting a mixture of oxygen and ozone to pressure at a temperature of -23° to -25°, the ozone remaining liquid at 10 atmospheres pressure. The experiment needs to be performed with great care, owing to the liability of the ozone to change into oxygen with evolution of heat and explosive violence. The beautiful blue of this substance has led to the hypothesis that the color of the atmosphere at great depths may be due to the presence of ozone.

The Providence mine, Nevada county, will soon have its 20-stamp mill increased to 60 stamps. A new shaft will be sunk and new hoisting works put up.

## The Brush Electric Light.

(CONTINUED FROM PAGE 281.)

the lamp itself, as readily as if it were a gas burner. The lighting of interior spaces is in this way fully provided for in a practical manner.

In the matter of lighting streets and open spaces electric light possesses many advantages not possessed by any other illuminating agent. The electric lamps can be placed on top of lamp posts of moderate height, as in the lighting of Broadway, New York, each electric light providing for the illumination of a space 200 to 300 ft. in diameter; or the lamps may be placed upon towers at a considerable elevation above the ground and above adjoining buildings, as is done in Washash, Indiana, and Akron, Ohio; each light, or group of lights, providing for a general illumination over an area a mile or more in diameter. Either of these plans is perfectly practical and successful, and both have been thoroughly tested. For the lighting of cities and towns of moderate size the latter plan is the more economical, and will, no doubt, be very largely adopted. The town of Washash, Indiana, was the first in the world to light its streets wholly in this way, and they find that four Brush lights of 3,000 candle-power each, placed on an iron flag-staff on the dome of their court house, at a height of about 130 ft. above the ground, are sufficient for the general illumination of an area from one-half to three-quarters of a mile in every direction. Some of the streets although they are not nearer to the lights, because the light is not intercepted by intervening buildings. It is stated, however, that even in the streets where no direct light falls, and where the shadows are greatest, there is yet enough diffused light to permit of getting around without the use of other light. It is also stated that even at a distance of two miles from the lights there is a sort of general illumination produced, which is of considerable value.

By placing a sufficient number of powerful electric lights upon towers high enough, it is no doubt possible to produce an amount of light that would be practically as efficient as daylight for the lighting of all spaces within a reasonable distance of such towers. A sufficient amount of light could be thus provided to light the interior of buildings and dwellings sufficiently for ordinary purposes. This is the plan that has been proposed for the lighting of the Capitol and its surroundings at Washington.

It is proposed to place upon the dome of the Capitol, and upon six towers surrounding it, at a distance of 1,000 ft. from it, no less than 450 electric lights, each of 6,000 candle power, or a total light of 2,700,000 candle power, equal to 200,000 4-ft. gas burners. The effect of such an enormous massing of light at such a distance above the ground and surrounding buildings would produce a surprising effect, and within a considerable area would, no doubt, be practically equal to daylight. If this plan is carried out the Brush light will be used. This subject will be brought to the attention of the next session of Congress.

The officers of the Brush Electric Company (the home company) of Cleveland, Ohio, are as follows: Gen. Mortimer D. Leggett, President, (formerly Commissioner of Patents); George W. Stockly, Vice-President, Treasurer and Business Manager; F. K. Collins, Secretary; Nathan S. Possons, Superintendent; W. J. Possons, Assistant Superintendent.

Agencies for the sale of apparatus and appliances have been established in all sections of the country. The most important of these are the Brush Electric Light Co., of New York, the Brush Electric Light Co. of New England, and other companies under similar names at Philadelphia, Washington, Baltimore, Pittsburgh, Cincinnati, Chicago, St. Louis, Denver, Salt Lake and San Francisco. The officers of the California Electric Light Co., representing the Brush patents for the Pacific coast, are: William Kerr, President; P. B. Cornwall, Vice-President and Treasurer; George H. Roe, Secretary and Business Manager, with offices at 119 O'Farrell St.

**THE PRESS.**—Anybody who is interested in mines anywhere on this coast, and who is not a subscriber of the MINING AND SCIENTIFIC PRESS, fails to keep posted as he ought. We gather the news from all points, and in addition to this, keep track of all new mining and metallurgical appliances and processes as they come to the front. The PRESS will be found in the miner's cabin in every camp on this coast. It is the oldest of the mining journals, and has steadily promoted the interests of legitimate mining for upwards of 20 years.

The trouble between the Mechanics' Union and the mining companies at Cherry Creek, White Pine county, have been settled. A public meeting being called, and the majority of citizens voting that the Union was not justified in demanding the advance of wages named by them, the Union acquiesced in that opinion and all of them went back to work at the old rates. None of the men who participated in the strike were discharged. Everything is running as usual at the mines and mills.

And now comes San Bernardino, and claims that nothing is wanted to make it the richest mining county in the State but capital.

ANTIMONY is selling in Liverpool at £62 to £64 per ton for French Star Regulus.

QUICKSILVER in England is £6 10s per flask.

## News in Brief.

JAMES T. FIELDS, author and publisher, of Boston, is dead.

THEATRICAL performances are now prohibited in Cincinnati on Sundays.

MANY ranchmen have been driven into Fort Buford by hands of hostiles.

JAY GOULD is working to get control of the Southwestern system of railroads.

SINCE the 1st of February one nursery near Bakerville, Kern county, has shipped 120,000 eucalyptus and acacia trees.

The item of \$12,000 for salary of State Engineer Hall, has been struck from the general appropriation bill.

MRS. DEMENT, an emigrant's wife, and two of her children were burned to death by a forest fire in Arkansas while camped on a mountain.

A DEPOSIT of mammoth bones has been found near Yakima City. They are pronounced to be the relics of an extinct species of elephant.

A LARGE number of Polish and Russian emigrants, who arrived at New York on a steamer infected with smallpox, resisted all attempts to vaccinate them.

In answer to an advertisement for 35 men to go to the Arctic in the *Mary and Helen* in search of the *Jeannette*, upwards of 100 able-bodied men made application.

A LONDON despatch says the Governor of Cape Colony telegraphs that the Basuto Chief is willing to accept arbitration, his people meanwhile returning home.

MINISTER KASSON thinks that Austria and Hungary placed an embargo on American hog products more as a measure of protection than from sanitary considerations.

A private letter from the attorney of the Mussel Slough settlers at Washington, expressed hopes of a favorable hearing of the proposed pardon before the new President.

THERE are 127 small-pox and 107 typhus fever patients on Blackwell's Island, New York. During the week there were 33 new cases of small-pox and 37 of typhus fever.

It is stated that proposals will be made in Parliament for the erection of a national monument in Westminster Abbey to record the name and services of Lord Beaconsfield.

CHINESE sailors are being shipped on wheat ships from this port, white sailors being very scarce. The Chinese get \$25 per month and board, with three months' pay in advance.

The agitation in Greece is increasing. The Greek note this week will call the attention of the Powers to the fact that they have not replied to the reservations demanded by the former Greek note.

ADVICES from Tunis state that the Sultan has approved all the measures the Bey has lately adopted and negotiations have been opened with the Powers to protect the rights of both the Sultan and the Bey.

The leaders of the Oklahoma invasion are attempting to utilize the freedmen in gaining a foothold in the Indian Territory. The Commissioner-General of the Land Office pronounces the attempt illegal.

FLORIDA oranges have been successfully imported into England, a recent experiment demonstrating that the fruit arrived in excellent condition. The enterprise is very favorably regarded in England.

H. E. Davis, principal owner of the South Pacific Coast railroad, denies that that road has been sold to the Atchison, Topeka and Santa Fe, the Atlantic and Pacific, or any other road, or to any person or persons.

It is said that the Kern Valley Canal Company have commenced, or are about to commence, the extension of their canal to Tulare lake, with a view of completing a continuous line of water communication to San Francisco.

AN agitation in favor of the immediate abolishment of Cuban slavery has been begun in Spain. JEREMIAH HODNETT, Chairman of the Ballydehob Land League, has been arrested in Ireland under the Coercion Act.

A FEW days since Willie Barr, a child 5 years of age, who lives at Olympia, was butted in the face by a sheep. The little fellow was struck on the right cheek, and his jaw was broken in the center so that one half of it fell down.

A LONDON despatch says: In order to repress an attempt by the Algerian army to take advantage of the Tunisian difficulty for revolt, France has decided to send considerable reinforcements there. It is stated that 50,000 troops will go.

A BERLIN despatch says: Another audacious circular addressed to the Czar has been issued by the Nihilists, pointing out that the indiscriminate execution of those concerned in the assassination of Alexander II only served to strengthen the ranks of the Nihilists by driving many lukewarm persons into the extreme faction of the party.

BRADY, the deposed Assistant Postmaster-General, has written a long letter of denial to the New York *Herald* of the charges made against him while at the head of the Contract department of the Post Office Department. He claims that Congress is responsible for the increased cost of the Star routes, and demands an early investigation.

It is rumored in St. Louis that a sale has been effected of a majority of the stock of the International and Great Northern railroad to a combination of New York capitalists, of which Jay Gould is the head. This will consolidate under one management the Missouri Pacific, the Missouri, Kansas and Texas, the Texas and Pacific and the International and Northern roads.

**COPPER.**—Quotations of copper in Liverpool are: Good ordinary brands, £61 to £61 5s per ton; ore, 12s 6d and Regulus 12s 9d per unit. The market in Liverpool is in a stagnant condition. Although supplies have been reduced, speculation in this metal is dormant. The total visible supply is 2,149 tons less than a month ago, and 3,625 tons less than a year ago. Chile exports to the end of March equal 10,048 tons fine. Stocks of West Coast prodnce equal 32,391 tons fine.

CHRISTOPHER OSCANYON, Turkish Consul-General at Washington, was refused by the Supreme Court the privilege of collecting a commission on arms purchased by him for Turkey, on the ground that a public officer has no right to sell his influence.

A DISPATCH from Wheatland says: After great perseverance the San Francisco Copper Co., at Spenceville, have been rewarded by striking a body of ore which shows by actual smelting fully 40% of copper.

THE Green Mountain Gold Mining Co., of Plumas county, paid a dividend of 7½ cents per share, in New York recently. This is the 22d dividend, and the grand total is \$146,750.

THE Starr-Grove Mining Co., of Nevada, has declared a dividend of 10 cents per share, payable at New York on the 30th of April. This will be the sixth dividend, making a total of \$120,000.

A rich strike has been made in the old McKee mine located in the White mountains, and about seven miles from Benton, the property of Caffery & Anderson.

THE Bodie *Free Press* says a number of miners have returned to that camp from Tombstone.

About 70 men are now employed at the Rising Sun mine, Colfax.

## Traveling Agents.

We want several canvassing agents who will make it their business to solicit subscriptions and advertising for our first-class progressive newspapers. Men of ability and experience can secure good pay and permanent employment. Send references and state your past occupation, etc., to the publishers of this paper.

## Our Agents,

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORN—San Francisco.  
A. C. KNOX—Sonoma, Napa, Lake and Mendocino counties.  
G. W. MCGRAW—Santa Clara county.  
M. P. OWEN—Santa Cruz county.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
N. E. BOYD—San Bernardino Co.  
JARRIS C. HOAG—California.  
B. W. CROWELL—Tehama and Butte counties.  
D. W. KILLGORE—Santa Barbara, Ventura and San Luis Obispo counties.  
A. LEONARD MEYER—Utah, Idaho and Montana Ter.

## Attend to This.

Our subscribers will find the date they have paid to printed on the label of their paper. If it is not correct (or if the paper should ever come beyond the time desired), be sure to notify the publishers by letter or postal card. If we are not notified within a reasonable time we cannot be responsible for the errors or omission of agents.

PERSONS receiving a sample copy of the MINING AND SCIENTIFIC PRESS with this notice marked, are requested to examine the merits of the same, and consider fairly its claims for support, and if consistent, subscribe for the paper through the P. M. or agent delivering it, or otherwise. We will send it, on trial, at the rate of \$4 per annum for any period the reader may wish. Please notice our terms elsewhere, and if desired, send for further samples and information. Those who can circulate this No. further to our advantage are invited to do so.

IMPORTANT additions are being continually made to Woodward's Gardens. The grotto with its aquaria constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

A gentleman just arrived from Colorado who is thoroughly posted in the treatment of refractory ores, and who has been a director for 3 years in the Austrian Government Reduction Works in Europe, would like to engage his services to a Mining and Reduction Company, either as Superintendent or Assistant, or to take charge of the Assay Department. Address H. S., this office.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

The State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M. to 5 o'clock P. M., daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.



Metals.		
[WHOLESALE.]		
WEDNESDAY, April 27, 1881.		
IRON.—		
American Pig, soft, ton.....	32 00	@33 00
Scotch Pig, ton.....	26 00	@27 00
American White Pig, 800.....	—	—
Oregon Pig, ton.....	—	—
Refracted Bar.....	41 00	@ 8
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ 31
Norway, according to thickness.....	8 1/2	@ 9 1/2
STEEL.—		
English Cast, lb.....	16 00	@ 18
Black Diamond, ordinary sizes.....	13 00	@ 15
Brill.....	9 00	@ 10
Flat Bar.....	—	@ 16
Plow Steel.....	9 00	@ 10
COPPER.—		
Ingot.....	—	@ 52
Sheet.....	—	@ 25
Sheathing, Tinned 14x18.....	—	@ 42
Nails.....	—	@ —
Bolts.....	35 00	@ 42
Oil.....	—	@ 13
Bar.....	—	@ 22
Precipitate, 100 lbs.....	18 00	@ 19
LEAD.—		
Pig.....	47 00	@ 5
Bar.....	—	@ 6
Pipe.....	—	@ 8
Pipe, soft.....	—	@ 9
Shot, discount 10% on 500 Bags.....	—	@ 2 10
Drop, per bag.....	—	@ 2 30
Chilled.....	—	@ 2 50
TIN PLATES.—		
10x14 C Charcoal.....	—	@10 50
10x14 C Coke.....	10 00	@10 00
Bacon Tin.....	—	@25 00
Antimonial.....	—	@20 00
I. C. Charcoal Roofing 14x20.....	—	@10 00
20x28.....	20 00	@21 00
ZINC.—		
By the Cask.....	—	@ 10
Zinc Sheet 7x3 ft. 7 to 10 lb, less the cask.....	10 1/2	@ 11
NAILS.—		
Assorted sizes.....	4 00	@ 4 75

Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending April 26, 1881.

HIGHEST AND LOWEST BAROMETER.

pr. 20	Apr 21	Apr. 22	Apr. 23	Apr. 24	Apr. 25	Apr. 26
30.092	30.079	30.117	30.193	30.233	30.222	30.161
30.058	30.015	30.018	30.061	30.177	30.131	30.069

MAXIMUM AND MINIMUM THERMOMETER.

61	63	60	63	62	63	69
52	53	53	51	51	51	55

MEAN DAILY HUMIDITY.

81.3	78.3	68	71.3	68	68	72
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PREVAILING WIND.

SW	W	W	W	NW	SW	W
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WIND—MILES TRAVELED.

264	210	204	219	207	123	113
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STATE OF WEATHER.

air.	Cloudy	Clear.	Fair.	Clear.	Clear.	Clear.
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RAINFALL IN TWENTY-FOUR HOURS.

	.01	.06
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total rain during the season, from July 1, 1880, 28.95 inches.

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by SUTRO & Co.]

SAN FRANCISCO, April 27, 3 P. M.

SILVER, 1.

GOLD BARS, 830@910. SILVER BARS, 10@18 1/2 cent. discount.

EXCHANGE on New York, 10, on London bankers, 49 1/2 @ 49 3/4. Commercial, 50; Paris, 5 francs @ dollar; Mexican dollars, 30@32.

LONDON Consols, 1 00 1/16; Bonds, (4 per cent), 118 1/2.

QUICKSILVER in S. F. by the flask, 42 1/2 @ 45 lb.

Amusements.

BALDWIN'S THEATER.

THOMAS MAQUIRE.....Manager.  
CHAS. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer

THE TOURISTS.

Corner Market and Powell Streets. Open every evening and Saturday matinees. Box office open daily.

STANDARD THEATER.

AMORY SULLIVAN.....Manager

SPARKS.

Bush Street, between Kearny and Montgomery. Open every evening and Saturday matinees. Box office open daily.

THE TIVOLI GARDENS.

KRELING BROS.....Manager.

OLIVETTE.

Eddy Street, between Market and Mason. Open every evening.

Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

Lewis Consolidated Silver Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Pioneer Mining District, Pinal County, Arizona.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Twenty-third (23) day of March, 1881, an assessment, No. Four (4) of Six (6) Cents per share was levied upon the capital stock of the Corporation, payable immediately, in U. S. Gold Coin, to the Secretary, at the office of the Company, No. 310 Pine Street, Room 15, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the Second (2) day of May, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the Twenty-third day of May, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.


J. W. FEW, Sec'y.

Office, No. 310 Pine Street, Room 15, San Francisco, Cal.

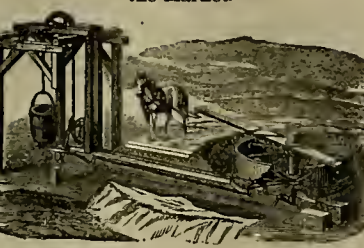
Mining Books.

Orders for Mining and Scientific Books in general will be supplied through this office at published rates.

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One Horse can easily belt over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

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on Mining, Metallurgy, Etc.

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BY GUIDO KUSTEL,  
MINING ENGINEER AND METALLURGIST.

Concentration of Ores (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arseniurates, and Gold and Silver Ores generally, with 120 Lithographic Diagrams, 1887.

This work is unequalled by any other published, embracing the subjects treated. Its authority is highly esteemed and regarded by its readers; containing, as it does, much essential information to the Miner, Millman, Metallurgist, and other professional workers in ores and minerals, which cannot be found elsewhere in print. It also abounds throughout with facts and instructions rendered valuable by being clearly rendered together and in simple order. It contains 120 diagrams, illustrating machinery etc., which alone are of the greatest value. PRICE, \$7.50

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This rare book on the treatment of gold and silver ores without quicksilver, is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and explains the why and wherefore.

It contains 155 pages, embracing illustrations of furnaces, upsmets and working apparatus.


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WIRE BOUND

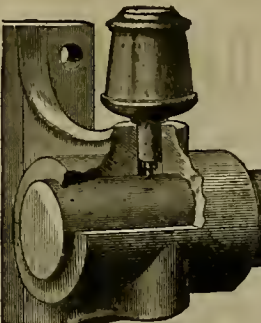


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Cups for Engine, Machine and Shaft Bearings and Loose Pulleys. We furnish the Albany Compound (a solid), \$1 worth of which will last as long as from \$2 to \$10 worth of Oil, with no stop, and with ONE-TWENTIETH the ATTENTION required by the best Oil Cups.

If the Cups are not satisfactory, we will receive them back and make no charge.

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The Albany Cylinder Oil does not contain fatty acids—is incapable of being decomposed and does not form insoluble soaps.

If it becomes mixed with boiler incrustation it diminishes its tendency to cling to the sides of the boiler, and thus exerts in this respect also a beneficial action.

THE ALBANY  
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The Cheapest and most economical Cylinder Cup. Can be instantly regulated to feed a few drops per minute, and the drops can be counted as they pass through the glass gauge.

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ALBANY SPINDLE OIL,

Genuine West Virginia Lubricating Oil,

SIGNAL OIL for outside lights of vessels, etc.

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Mining Machinery supplied.

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Extra sizes and lengths made to order on short notice.

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THE BALDWIN LOCOMOTIVES, every style and for any service.

THE BALDWIN STEAM MOTOR for use on City and Suburban Roads.

FREIGHT CARS, PASSENGER CARS, STREET CARS, CAR WHEELS, from A. Whitney & Sons. RAILROAD IRON. SPIKES, BOLTS, Etc.

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FROM BEST EASTERN MAKERS.

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BLASTING POWDER

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Excelsior Powder Company.

This is no so-called "safety" Powder, but a powerful explosive, and as safe to handle and use as any nitro-glycerine Powder on the continent. There is no headache or nausea in the use of this Powder, as the noxious fumes are entirely done away with. It is put up in cartridges of any size to suit consumers and is exploded with cap and fuse, the same as any other high explosive. The following testimonial is a sample of hundreds of the same tenor being constantly received:

GOLD HILL, August 17, 1880.

AGENT EXCELSIOR POWDER CO.—Dear Sir:—I have used your Powder in test cement and hard blasting rock, and find it superior to any Powder in use on the Coast. It does its work effectively, and does not leave the person using it with a severe headache, like the other Powders so to the majority of miners. In recommending it I would suggest, give it a fair trial and I am confident it will speak for itself. Wishing your Company success,  
I am respectfully yours, etc.,

GEORGE CLARK,  
Foreman Sierra G. and S. M. Co.

Address all orders to  
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42 years' practical experience; 14 on Pacific Coast.

ASSAYING No. 1 WALL ST. N.Y. J. P. Phillips & Co. EXAMINER OF MINES AND ASSAYER CONSULTING ENGINEER & METALLURGIST TAUGHT

AUTHOR OF The Explorer's, Miner's and Metallurgist's Companion, 672 pages, 33 Illustrations (2d edition). Price . . . \$10 00 The "Explorers' and Assayers' Companion," of library or pocket size (2d edition), 428 pages, now ready, . . . 6 00 Various Prospectors' and Assayers' Tools. SEND FOR LIST OF PRICES.

Dewey & Co. 202 Patent Ag'ts



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Marine, Stationary and Portable Boilers, Smoke Stacks  
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Water Buckets, Gasometers, Girders,  
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ALL KINDS OF SHEET IRON WORK,  
Repairing promptly attended to at the lowest  
possible terms.

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Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery  
constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

### Golden State & Miners Iron Works.

Manufacture Iron Castings and Machinery  
of all kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folom, S. F.

### California Brass Foundry,

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SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc and Babbitt  
Metal Castings, Brass Ship Work of all kinds, Spikes,  
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with dispatch.  
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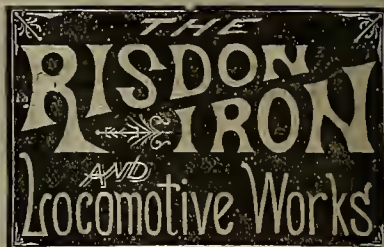
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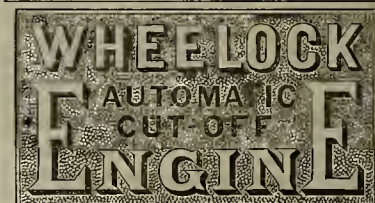
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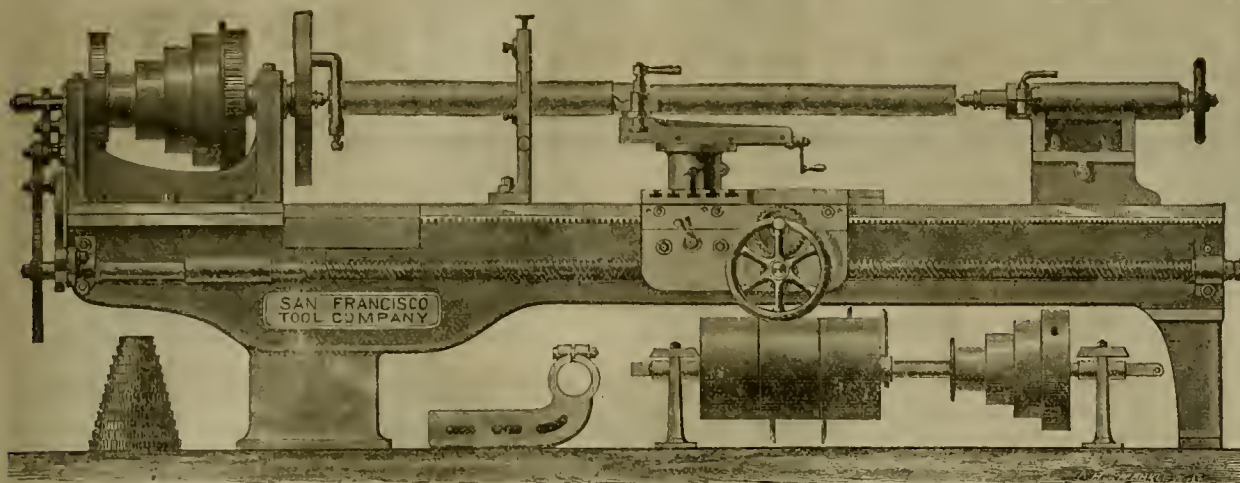
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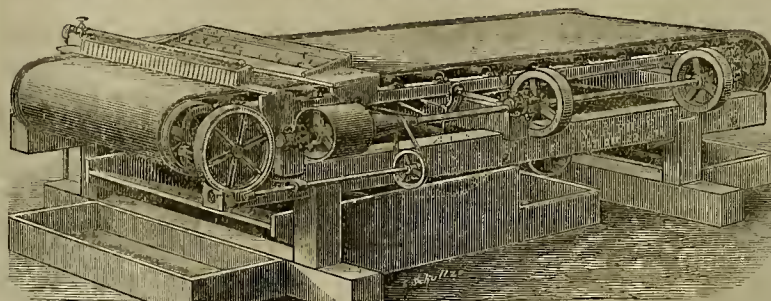
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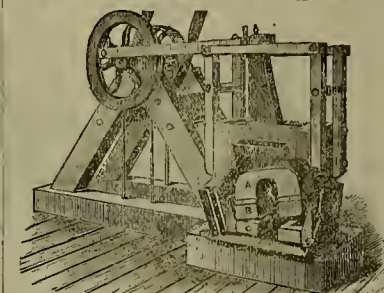
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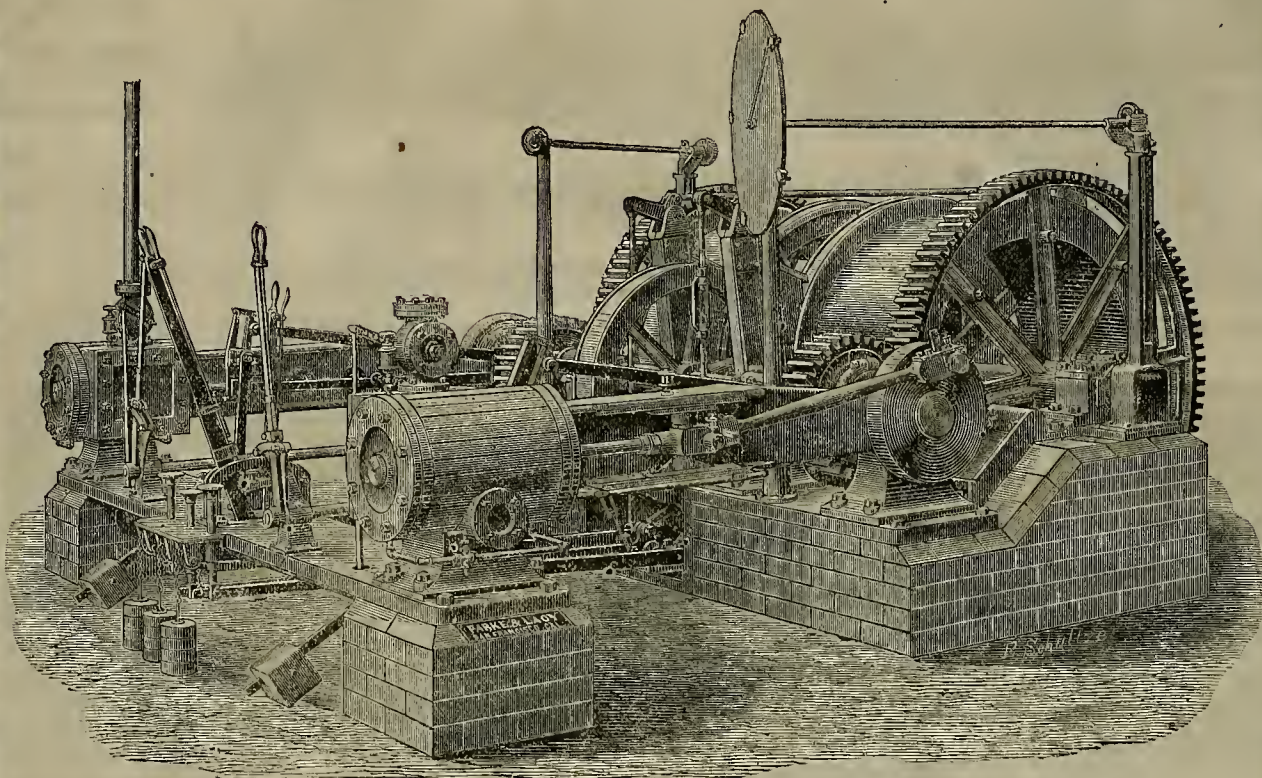


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SAN FRANCISCO, SATURDAY, MAY 7, 1881.

VOLUME XLII  
Number 19.

## A Novel Planing Machine.

We illustrate this week a novel planing machine, made by the San Francisco Tool Co., a machine so thoroughly a departure from common practice that it seems somewhat "revolutionary." Novelty is, however, no object in the design of this or any other machine tool of the company. There is a purpose in the arrangement throughout, which we will proceed to explain:

To meet the requirements of a small shop or where repair work is done, there is generally a shaping machine and one or more planing machines of the ordinary kind, and even with these there are often pieces to be planed that cannot be operated upon because of shape or dimensions.

The machine here shown is to meet such cases. It will perform nearly all kinds of planing on large or small pieces, and does not cost more or occupy more room than an ordinary shaping machine of similar capacity. The drawing is in true elevation, and shows clearly the method of construction.

The tools traverse parallel with the main frame, and adjust transversely 20 inches, or will plane over 24 inches wide, if required. The length of the stroke on the machine shown is from two inches to four feet.

There are two tables on which work can be fastened independently, or by placing a filling-in piece between a continuous table four ft. long is formed. For large pieces the two tables can be readily removed, and as the tools "overhang," almost any kind of a piece can be placed beneath and planed off.

The tools are driven by a strong steel screw, on which there are three separate nuts, making an aggregate length of 12 inches. One of these nuts adjusts so as to prevent backlash; and all are made from solid brass—not filled with type metal, as is common with the old screw-planing machines. There are no gear-wheels employed. The driving pulleys are placed directly on the end of the screw, so that the machine is noiseless—a feature that can be claimed for no other now in use.

In large works, where a "set" of planing and shaping machines are employed, there is less advantage from one having such a wide range of adaptation, but for present circumstances on this coast, and especially for repair work at mines or in large factories, such a machine tool cannot fail to meet the expectations of the company who have so boldly left the beaten track in deference to local requirements.

The company have a four-ft. machine ready for their own use, and are able to supply them of that or greater length.

For the cattle-car prize at Chicago 480 models and 243 plans were presented, 51 models and 81 plans coming from Illinois. There were eight ladies among the competitors. There have been 116 patents issued on cattle care by our Patent office.

TELEPHONES are received with favor in China, because a system can be carried out, which is impossible with the telegraph, owing to the peculiarities of the language and the difficulty of devising signs.

A STEAMER aground has checked the traffic of the Suez canal this week.

## The State Engineer.

It will be recollected that the Senate struck out of the appropriation bill the sum of \$30,000 for the salary of the State Engineer, and for the completion of the irrigation works of the State Engineer's department or a preparation of final report, with maps and illustrations. One afternoon of last week was devoted by the Assembly to the question as to whether or no it would concur on the Senate amendment which cut out this sum. The debate was largely a repetition of the arguments pro and con advanced at the time the House had the subject under consideration before. The Sacramento Bee says:

"Wasson, of Mono, attracted much attention by making his maiden speech of the session on the subject. He has always been regarded as a silent, hard-working member, who interfered with no one else's business and always attended to his own, looking all the while to the advancement of the interests of his constituents. He spoke strongly in favor of making the appropriation and against the Senate amendment striking it out. Said he: All the southern counties have been mentioned by previous

cal survey as yet, and that it had been cut off just where it should have been continued.

Other speeches were made, and the House refused to strike out the appropriations by a vote of 39 yeas to 33 nays.

## Montana Placer Mines.

A correspondent of the Press writes from Virginia City, Montana, and says that their mining season opened three or four weeks earlier than usual this year. He commenced sluicing March 19th, and has had little trouble with frost. November, December and January were cold and stormy, and large quantities of snow drifted and stored away in the mountains, and placer miners anticipate a steady supply of water, and consequently a more than ordinarily prosperous season.

Alder gulch miners depend almost entirely on the natural flow for water. Some lakes near the head of the gulch, which have a natural outlet in another direction, have for a number of years been utilized as reservoirs, and during three of the driest months of the season furnish nearly as much water as the natural flow of Alder gulch. Several projects to bring on wa-

## Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening, Prof. Davidson in the chair. Charles F. Crocker and L. E. Blockman were elected members. Among the donations to the museum were the following:

Two ribbon seals, fully mounted, from Capt. Lewis W. Williams, of the brig *Hidalgo*. Also the collection outfit furnished by the Swedish government to Dr. Gustav Eisen, and used in marine dredging on this coast. This was purchased by the Alaska Commercial Company, and by them presented to the Academy.

Mr. Dwight Whiting presented the tooth of a fossil horse, found 200 ft. below the surface, where it was picked up on the hard pan, in the workings of the Spring Valley hydraulic mine, at Cherokee Flat, Butte county, Cal. It is an exceedingly interesting and quite valuable fossil specimen, and very like some found in the breccia beds below Los Angeles. Mr. R. H. Stretch presented a rodent, called by the Indians swellel, a very rare animal, which cuts off plants and lays them up to dry like hay.

Four specimens of calcareous tufa from Soda springs, Mendocino county, Cal., by J. McNabb; specimens magnesite and specimen steatite, foothills back of Visalia, from C. Comcoe; two specimens gray antimony and specimen of lead ore from Mexico, by E. T. Cox; 4 specimens of gray antimony found 12 miles east of Hollister, San Benito county, by G. F. Beardsley. From J. C. Crocker, specimens of calcareous tufa, quartz, mica, schist, red jasper, chalcedonic quartz, gypsum, all from Coast range west of Buena Vista, Elough, Kern county. From A. O. Thoms, Bakersfield, specimens of

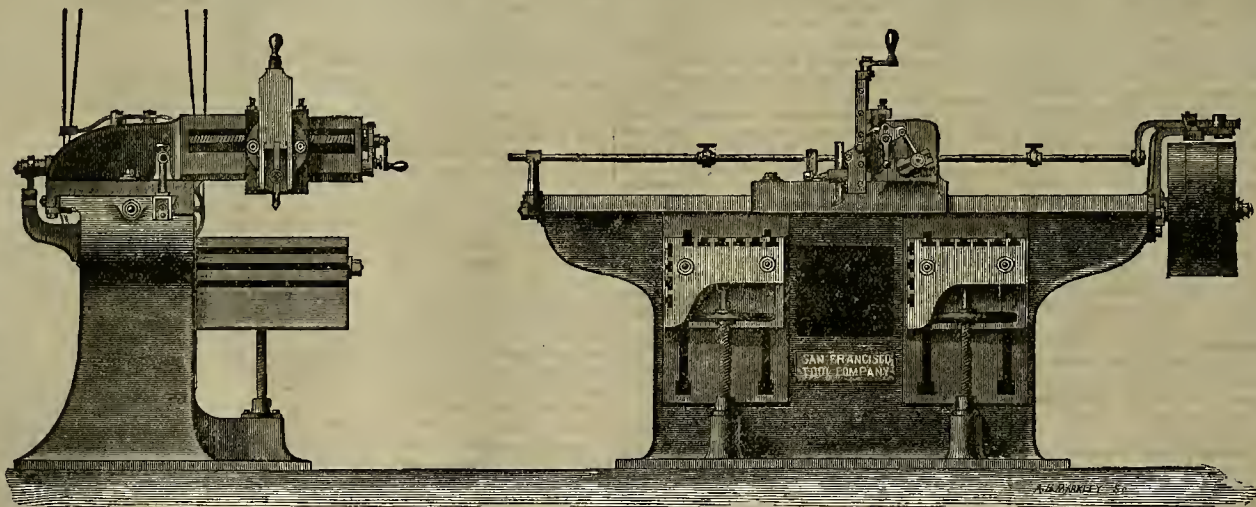
free-gold quartz and copper ores from Kern county, and silver and copper ore from Inyo county. From C. D. Gibbs, specimens of gypsum, water-worn stone, green marl, impure asphaltum, Kern county. From Foye Bros., specimen German black lead. From W. H. Wallace, garnets in matrix of micaceous schist, from Slicken river, Alaska. A specimen of stone adze from Arizona was presented. Mr. Redding thought it strange, that while these adzes were found in Alaska and in Arizona, none were found in this State. Prof. Davidson said he had seen them at Port Orford, Oregon.

W. G. W. Harford, Director of the Museum of the Academy, read a paper on "Seals," describing the different varieties, their peculiarities and habits.

Capt. A. E. Bruno delivered the second of his lectures, describing his adventures in the South Pacific islands, speaking, on this occasion, more particularly of the New Guinea. One of the natives of the New Hebrides islands, a boy about ten years of age, was with Capt. Bruno, and attracted much attention at the meeting.

THE Big Horn, Grey Bull, Yellowstone, Sun River, Wood River and Teton countries are described for the benefit of prospectors, in the book advertised in another column by J. A. Campbell & Co.

It is said that the Spanish free traders urge the Cabinet to negotiate a treaty of commerce with the United States in order to obtain special concessions for exports from Cuba.



COMPOUND PLANING AND SHAPING MACHINE.

speakers, except Inyo and Mono. It is for this reason, Mr. Speaker, that I desire the floor. I desire to state that the waters heading in Mono county and running through Inyo are greater than all which originate in San Bernardino, Los Angeles and San Diego. In that proportion the irrigable lands in Owen's valley are correspondingly great. I have favored the Drainage act throughout, and I have nothing in that connection to take back. Much has been said about the maps of the State Engineer—they were simply a necessary incident in connection with irrigation. It now resolves itself into the question—in connection with these maps—to furnish written reports describing the quality and quantity of land and the amount of water contiguous thereto. It is not a question of water already appropriated; it is a question of storing away of the water which runs off during the melting of snows and in the rainy seasons. The question of riparian rights and water already appropriated is a question of law—all the rest of the information which can possibly be gathered is of importance to the poor people who now live here, or who may desire to come. Owen's valley alone has land and contiguous water enough to support 100,000 people, but it is as unknown as if it was in the moon. If they say this information is not important on the part of the State to give to the world, then you might as well cut off the Census Bureau in the giving of its statistics on immigration and emigration, also the commissions which give information on the subject of horticulture, agriculture and mineralogy. He claimed that there was no geologi-

cal survey as yet, and that it had been cut off just where it should have been continued.

Other speeches were made, and the House refused to strike out the appropriations by a vote of 39 yeas to 33 nays.

Alder gulch is mostly held in large tracts by 11 different companies and individuals. These are, nearly without exception, composed of men who, with indomitable energy, have stood by Alder gulch through evil report and good report, and have finally been successful in securing a competence for old age.

It is fashionable just now in England to organize all the new companies, with £1 shares. Indian gold mining companies seem to have set the fashion. The English papers think the idea a good one, as it enables small capitalists to invest, and gets as many shareholders who will be likely to attend meetings of the companies.

With all the Indian gold mining companies organized of late in London, not one has yet paid any dividends.

The French have gained several victories over the insurgents in Tunis, and are continuing their forward march.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eos

### Stirring Roasting Ore.

EDITORS PRESS:—I have just seen Mr. Knstet's communication on the above subject, in your issue of February 5th, referring to my remarks on "wheels instead of bars" in roasting furnaces. The subject is not an important one, as the various mechanical furnaces are rapidly superseding the reverberatory in this country, but the proposition advanced by me, namely that the single pivoted wheel, when attached to the front of the door-frame, reduces the angular range of the hoe, is a mathematical one, easily demonstrated by means of a simple diagram. To prove that I am not "ignoring facts," I will state a few.

The door frames with wheels, used by Mr. Knstet at Melrose, but rejected by Mr. Stewart, who built a new furnace, are now, or some of them, in a two-hearth furnace at the Chicago mine in Shasta county. This furnace was constructed under my direction, the lines for the walls being marked on the hearth to conform to the range of movement of the hoe, as directed in my book on "Leaching Gold and Silver Ores," the area of the hearth being several square ft. less than would have been the case had I used bars, or the common long rollers, instead of the wheels. I expected the wheels to work well, but the gentleman in charge of the mill does not like them, and intends to substitute bars. C. H. AARON.

### Climate of Tehama County.

Here as elsewhere, climate is affected by the following agents, viz.: latitude, proximity and access to the ocean and its currents, altitude above level of ocean, its position as regards mountain ranges, &c.

(1.) The latitude of the county, as well in fact of the whole State, tends to make the average climate a pleasing medium between the intense cold of the north and burning heat of the tropics. Our latitude is such that during the sun's greatest distance north, the currents of air caused at the solar vertical (by refraction) having turned to the north descend upon us as dry winds, we being within the second wind zone (from 32° to 43° north latitude) thus giving us a hot and dry summer. During the months of the sun's greatest distance south, the rain zone, on account of the position of the sun, is somewhat changed, thus bringing us within its range and giving us our wet season.

(2.) The elevation of Tehama county varies from about 300 ft. at the river to 5,000 or 6,000 ft. in the extreme west, and 8,000 or 10,000 in the east. The portion of the county included in the valley averages about 400 or 500 ft. above the level of the ocean. We therefore have a climate which is much affected by elevation. This, during the summer months, is taken advantage of by a goodly portion of the population, who, having prepared themselves with a camping outfit, leave behind them the oppressive heat and dust, the cares and perplexities of business, and, facing either eastward or westward, go up, up, up, through all the degree of temperature, from the most oppressive heat to a most enjoyable degree of coolness and healthfulness.

(3.) Some of the effects of the proximity to the mountains have been mentioned; one of the principal effects is caused upon the temperature of the nights, especially in the spring, by the melting of the snow.

(4.) We owe it principally to the warm currents of the Pacific ocean that our climate is such as places us below the snow limit, whereas a distance of 8,000 miles to the east must be traversed before we arrive at a point where this again occurs in the same latitude. True, the effect of these ocean currents, which strike this coast from Japan, is somewhat impaired by the Coast Range mountains, which form a great barrier; but this is compensated for by the fact that the two ranges of mountains (the Coast Range and the Sierra Nevada) close up the great caueway at the head of the valley, and inclose a body of air, which is in a measurable degree shut up by itself, and therefore tending to hold an even temperature.

MILL CREEK.—There is probably no camp on the coast, says the *Homer Mining Index*, that offers so many inducements to men of small means as Mill Creek. There is an abundance of water-power here during the greater portion of the year, and a great many small veins which will pay well in arastras. A few hundred dollars will build an arastra capable of reducing two and a half or three tons a day, and sometimes more. Along the west side of Lake canyon there is a large quantity of float quartz, some of it being very rich. In some places it is so plentiful that several hundred pounds may be gathered within an area of a few yards. There is enough of this float in sight to keep a number of large arastras going for a long time. The district is not half prospected, and there is every probability many good veins remain to be discovered.

## Copper Smelting—Its History and Processes.—No. 4.

[By HENRY HUBSEY VIVIAN, M. P.]

Now here we have it distinctly stated that Jochim Gans devised this manner of working after he was at Keswick, and it is plain that he did not bring the new "manner" with him. At the bottom of page 23 this passage occurs: "The number, nature and properties of which is full of humorous being wholly unknown to Mr. Daniell and his Sonne, or to any other of the Dutch workmen w<sup>ch</sup> have bin sent from Germany to the mines, that have bin in our copper ures, has bin the only cause of the unreasonable charge and long tyme spent before they could make of these ures perfect rough copper; which copper after the order used in tymes past by Mr. Daniell and his Son they never could, neither yet can make under xxii tymes passing thro the fire and xxii weekes doing thereof and sometyne more." "But now by Mr. Jochim's order of working we can—by once roasting and once smelting the ore (w<sup>ch</sup> shall be done in the space of three days), the same copper ore shall yield us black copper and copper stone, which neither Mr. Daniell nor his Sonne could or yet can do under xvi tymes passing through the fire and xvi weekes in doing thereof, and further in once roasting and once smelting the same black copper and copper stone again, which shall be done in two days after Mr. Jochim's order of working, I will bringe the black copper and copper stone into perfect rough copper, which Mr. Stemberger cannot make under xxii tymes passing through the fire and xxii weekes in doing thereof and sometyne more." Again at page 25, paragraph 4, we have the following, which distinctly proves reverberatory calcining, "hut hy stampinge the copper ore into powder and by roastinge the same powder after Mr. Jochim's order before it he smolten, and then letting water passe through the same roasted powder, the water doth not only carry the vitrial from the powder or ore, but also carries with it the burnt sinder of the sulphur." Now these extracts show the nature of the improvements introduced by Jochim Gans, and I know of no other way in which such effects could have been produced except by the reverberatory calciner and furnace. It must be observed that Nedham reports that by once roasting and once melting, black copper and copper stone (regulus) were produced in three days. Such a thing I believe to be only possible by using reverberatory calciners. Again he states that in once roasting and once melting, this black copper and regulus can be made into perfect rough copper in two days; this could only be done by the reverberatory furnace. Both these passages prove to me conclusively that the "manner" or "order" of working devised by Jochim Gans at Keswick was the reverberatory furnace process. He was doubtless a German, but he did not bring the process from Germany. I am not aware that there is any positive proof of the first use of the reverberatory furnace for copper smelting; but the extracts I have read contain such strong inferential proof that, until I hear something of a more certain character to the contrary, I shall give Jochim Gans the credit of having devised that most important "manner" of copper smelting at Keswick in Cumberland, in 1581-82, just 300 years ago. Jochim Gans at the same time proposed to wash out sulphate of copper from calcined ore, and Nedham, in his report to Lord Walsingham, devotes much space to this plausible proposal. The same idea has occurred to many a man since his time, and in each case

In Practice It Has Proved as Unprofitable As no doubt it did 300 years ago; for we hear no more of poor Jochim Gans or his sulphate process.

The next notice we have which I think it worth while touching upon is contained in a correspondence between Ulrich Frosse and His Right Worshipful Thomas Smith, Esq., Principal Customer of London, at his house in Fenchurch St., in London, 7th July, 1584, therefore two or three years later than the extract just given. Customer Smith was a holder of one-quarter part of a share of 1-14th in the "Mines Royal Society" in 1580-1-15th part. Ulrich Frosse is mentioned by a Mr. Carnsew as superintending a mine in Cornwall, and I infer that "he was a Cumberland man, because Mr. Carnsew proposes that he should take such men as he is now acquainted with of our countrymen, and work in competition with certain German miners whom Mr. Weston had introduced at Trewoorth, near Perin Sandes," Cornwall." On the 21st July, 1584, Thomas Smith writes to Ulrich Frosse, saying that Mr. Weston is going to Cornwall through Wales, and that he will take measures for transporting the copper ores to the "new melting-house at Neath, in Wales, which house, I understand, is ready, and we have taken order here that against he shall be ready to make copper he shall have from Keswick one of our copper makers, with an under melter and the Dutch carpenter, for a time, to serve and ready him in these causes." Now this fixes the exact date of the commencement of copper smelting in South Wales, namely, the autumn of 1584, and it shows that the skilled workmen came from Keswick. As the carpenter is especially called a Dutchman, I think it follows that the "copper maker" and "under melter" were not Germans. It is possible that the Dutch carpenter was a skilled millwright, as, later on, water power is mentioned, probably in connection either with blast or stamping machinery. In the latter part of the same letter, Ulrich

Frosse is told that "about Michaelmas next he shall go bye at Neath to take charge of our melting-houss and things there." Frosse writes to Carnsew on the 3d August, 1584, from Outbert parish, in Cornwall, a letter which seems to indicate that they had been trying to smelt in Cornwall, and had got the regulus and slag mixed up together. On the 9th June, 1585, Frosse writes from Neath to Mr. Carnsew. He advises having sent samples of their stones, or regulus, and copper, and complained he was waiting for more and richer ores from Cornwall, and wanted "to repair his water-wesre and furnaces." On the 4th July, 1585, Frosse writes to Dsham that they "had founde out a ways to mste 24 C of owre everye daye with one furnace, the Lord be thanked, and if we may have owre enough from yor side, we maye, with God's helpe, mste with tow furnaces in 40 weeks 560 tonnes of owre, having reasonable provision made for it; desiring yow from hence forward to sende such owres as yow have with as much speed as may be, not caring what owre it is." It appears, therefore, that, within less than a year after the works were started, Frosse felt master of the position, and was able to deal with whatever ore they sent him, but they had not yet refined copper. On the 7th March, 1586, Ulrich Frosse wrote to Mr. Carnsew: "Wee looke dayley for the copper refiner from Keswick, and have in readines as much copper roste and blake copper as will make a 20 tonne of good copper." He reported in the same letter that he "could melt in 7 hours 24c. of owre, with 8 or 9 seks of chare coles and 3 horslod of sea coles; melting many eorts of owres to gither ie the most profet and will emelt a greattall sonner." Now this passage shows that they had so increased their melting as to do upward of three tone per 24 hours, and that they could take any kind of ore, but, above all, it proves that they were

### Using Reverberatory Furnaces.

Because "sea coles" are suitable for such furnaces and not for blast furnaces. The charcoal was probably mixed with the coal to prevent its hindering too strongly, just as we now use "free" coal. The charge of 24 cwt. was curiously enough the same which was used by works up to a recent date. My object in giving these extracts is to show, not alone how copper smelting commenced in South Wales, which is of great local interest, but also how the South Welsh process of copper smelting, which may be said to be at this moment the ruling process of the world, began. The first introduction of copper smelting in Lancashire seems to have been in 1717, near Warrington. I think these extracts clearly prove that in 1581 Jochim Gans "devised a manner" of working copper ores at Keswick, which enabled him, by once roasting and once melting the ore, to produce black copper in three days from powdered ore, and I know of no other system than reverberatory furnaces by which that result could be attained; and we find Ulrich Frosse four years later, at Neath, with all the experience of Keswick, advising his employers that he had found out a way to melt a considerable quantity of ore per day in one furnace, "the Lord be thanked," and that he could deal with all kinds of ores, using sea-coal as fuel, which shows, beyond doubt, that he had improved Jochim Gans's reverberatories and was using them. This, I think, is the history of the invention by one man, and practical working out by another, of the South Welsh system of smelting copper. And now I naturally come to the consideration of that system, both in comparison with the European and Asiatic systems, and on its own merits.

### When I use the term

South Welsh System of Copper Smelting, I carefully avoid the term "principle" of copper smelting, because the same "principle" must be the base of all copper smelting. The ends are the same, but the means of attaining them are different. The difference lies in our use of reverberatory furnaces both for calcining and melting, while the other systems of the world depend (or perhaps more correctly depended) on roasting in heaps and melting in blast furnaces.

Let us then first consider the processes which must be gone through in either case to produce copper from its ores. Now, what are its ores? If you turn to a work on mineralogy or chemistry, you will find an infinite variety of ores and combinations of copper, 25 at least; but in practice copper occurs in nine cases out of ten in combination with sulphur. In by-gone times, large quantities of carbonates came to us from Anstralia and Chili. Even now, the latter sends us occasional cargoes of green ores, containing carbonates, silicates, chlorides, oxides, and other combinations of copper; but these ores unfortunately bear but a small proportion to the ore containing copper in combination with sulphur. The same is the case in other parts of the world, and we may therefore direct our attention almost exclusively to the smelting of sulphide of copper in combination with sulphide of iron, earthy matters, and every known and unknown metal and mineral in creation.

(TO BE CONTINUED.)

LUBRICATING GEARS.—Where a mill is driven by a mortise gearing, it has been recommended to use a mixture of pulverized chalk and linseed oil for lubricating purposes. It is said that this mixture is much better for wooden cogs than oil, tallow or flour. The chalk for this mixture should first be pulverized and then sifted with a fine sieve.

THE Brunswick and Woodworth mills, Carson river, will shortly be started up on tailings.

## Safety for Miners.

The burning of hoisting works over the shafts of mines is not of uncommon occurrences, and when such accidents occur they invariably prove fatal to all the miners underground at the time, if there be no other escape for the men than through the shaft over which the building is burning. The suffocation of four men in the Goodshaw by this means a few months since is still fresh in the minds of many. In that case the fire was attributed to the negligence of the engineer. But however careful an engineer or vigilant a watchman, and even with the best possible appliances for the extinguishment of fire, such an accident is liable to occur at any hour—by the explosion of a hoiler, etc. There are a number of mines in Bodie from the interior of which there is

### No Escape

Whatever, save through a single shaft covered by a building that is liable to burn down at any hour. The fire need not extend 10 ft. down the shaft to prove fatal to the imprisoned miners; the heat of the fire at the surface very soon exhausts the oxygen of the atmosphere in the mine, and the men are asphyxiated. Fatal results might be avoided in 99 out of every 100 such accidents by the following cheap and simple device, which the *Free Press* suggests for the consideration of mine superintendents and others having in charge the working of mines that have no connection with other mines through which miners might escape to the surface in case of the burning of a shaft house: Place strong and heavy iron drop doors in each compartment of the shaft, some distance beneath the surface, and let them be held up and open by a common hempen rope extending to the surface and so arranged about the top of the shaft that they will be burned in two at the first

### Approach of Fire,

Thus allowing the doors to close. To prevent them being raised by the tremendous draft caused by the heat above, they should be held down by a spring bolt. These doors would prevent the exhaustion of oxygen of the atmosphere of the lower levels for a long time; but by running a drift from the shaft to the surface, just below the iron doors, the atmosphere of the lower levels could never be materially altered by the heat above. This drift could be made to reach the surface at very little cost and at a safe distance from the burning building, and the men from below could ascend the ladders under the shield of the doors and escape through the drift or tunnel suggested. The doors might be placed within 20 ft. of the surface—thus lessening the danger of being broken by fallen timbers by lessening the fall of the timbers—and the drift run out under the waste dump. The whole arrangement would not cost more than \$250, and the suggestion is worthy the attention of mining men.—*Bodie Free Press*.

## A New Gravel Mining Enterprise.

De Groot, Birge & Co., of San Francisco, are opening up for the Massachusetts Mining & Investment Co., which recently formed at Boston for that purpose an incorporation called the Willow Creek Mining Co., a gravel claim on Willow creek, near the North Yuba, between Camptonville and Bullard's Bar, in Yuba county. The claim embraces what is known as Garden valley, which is one-fourth of a mile wide and one and a half mile long. Early in the fifties considerable placer mining was done there with very favorable results, the deposits of gravel being found quite rich in places. About 1853 or 1854, before the gold had been near all extracted, the big mines at Camptonville, Weed's Point, Railroad Hill and other places above there began to run their tailings into the valley, and as there was but little fall to the bedrock drove out the miners, and covered up the shallow but productive placer deposits which in the upper part of the valley are said to have been intact at the time. The bed of siltens is now from 12 to 20 ft. in depth. The Bostonians propose to work all of this ground to bedrock. H. De Groot has been there for six weeks past preparing to begin operations, and is about to let a contract for the construction of 475 rods of ditch, 250 rods of flume and 6,000 ft. of iron pipe, with a carrying capacity of 1,500 inches, through which to convey water to the ground. About 100 men will necessarily be employed by the successful bidders in doing the work. As there is no dump to permit of this vast mass of tailings and gravel being washed down and out of the lower end of the valley, it must be raised up out of the sink and carried away through flumes, 30 or 40 ft. above. For this purpose an improved elevator will be used. It consists of pipe inclined at an angle of 35°, the lower end resting in the claim. Into this a stream of water having a pressure of 400 ft. will be turned, and a little giant will be used to drive the tailings in front of the bottom orifice, where the stream will force it up through the pipe and into the sluices. After the work is once fairly inaugurated, six or eight men will be sufficient to do all the work around the claim. The projectors estimate that all of the dirt, including the wash from the mines above, will pay for working.—*Nevada Transcript*.

THE net profits of the Dunkin mine at Leadville for March are stated by Supt. Ford to be \$25,000.



## MECHANICAL PROGRESS.

## A New Silver Steel.

In seeking for an inoxidizable alloy, Mr. Peter de Villiers, M. D., of Silver Hill, St. Leonard's-on-the-Sea, England, has discovered that certain metals will not unite in certain proportions, and he has utilized this discovery to coat steel so perfectly that even the cutting edge of a knife blade is not blunted, or, rather, that the silvery surface remains uninjured when the knife is sharpened. In the first place, he makes an alloy of tin, 80; lead, 18; silver, 2=100 parts; or of tin, 90; lead, 9; silver, 1=100 parts. The tin is first melted, and when a brilliant whiteness of the surface of the metal indicates its thorough fusion the lead is added in a granular state, and the mixture is gradually stirred, preferably with a rod of very dry fir-wood. The silver, separately melted, is then added to and mixed in like manner with the compound. At this moment the fire under the melting pot or crucible containing the alloy must be quickly increased, till the surface of the metal has a slightly yellow tinge. It is then rapidly stirred, and run into molds to form ingots. When he has the choice between iron and steel for the manufacture of any article to be coated he takes the purest steel used for manufacturing purposes. The blade of a knife, for example, is immersed in a bath of a solution of muriatic or sulphuric acid—1 to 10 parts acid to 100 parts distilled water or filtered rain water, or weak aquafortis. When the blade is withdrawn from the bath it must immediately be plunged into pure water to be quickly and completely washed, and then it is wiped and dried as rapidly as possible with a piece of old linen, soft leather, or a very dry sponge. It is then subjected for about five minutes to a dry heat in a furnace or oven heated to 70° or 80° C.; it is then withdrawn and again wiped. The preceding operations have for their object the preparation of the iron or steel for impregnation with the alloy, the result being that the said iron or steel is perforated with a multitude of holes almost infinitesimally small. In iron, unless this metal is of excellent quality, the size of these holes is extremely variable, and sometimes there are defective parts which make the subsequent operations very difficult. In steel the difference of diameter of these holes is almost imperceptible, so that the subsequent operations are performed without difficulty. This is the chief reason of his preference for steel.

The knife-blade or other article, after its preparation as above described, is immersed in a metallic bath composed of the alloy made according to one or the other of the formulas hereinbefore given. The ingots are melted in a crucible of plumbago or refractory clay, and not in an iron vessel, as particles of the iron would mix with the alloy and render the same liable to oxidize in the open air, thus impairing the appearance of the impregnated knife-blade or other article. The iron or steel, previous to immersion in the metallic bath or alloy must be heated to a temperature of 50° or 60° Centigrade; the bath must be perfectly liquid, and stirred with a dry rod of fir-wood or poplar, and the surface of the molten alloy must present a fine, silver-white color, which is obtained by slow fusion and by stirring only when the whole of the mass is liquefied. If these precautions are observed the impregnation of the iron or steel will proceed rapidly, and the alloy will enter the artificially produced holes and the pores of the metal, which are slightly dilated by the previous heating of the said metal. For a knife-blade or similarly thin object an immersion in the alloy of a few seconds will suffice. A period of from two to five minutes will be required for pieces or articles of greater thickness, such as horse's bits, stable chains and the like.

When withdrawn from the metallic bath, the blade or other article of iron or steel is at once immersed in cold water, or is otherwise properly treated to harden or temper it, or to restore its temper as required. If left in the cold water for too long a time, the metal sometimes becomes brittle, and carelessness on the part of the operator will prevent any difficulty of this kind. The blade or other article having been wiped and dried without the application of heat, is polished in any suitable manner. It will then have the whiteness and luster of silver, and will have a ring or sound analogous to that of the latter metal, and may be considered unoxidizable under ordinary atmospheric conditions. But to obtain a more complete result, he gives it a second bath in an amalgam composed of mercury, 60; tin, 39; silver 1=100 parts. It is then either placed in hot molten silver, or has silver deposited thereon cold by means of electro-deposition, so as to obtain a new covering or coating to form part of the impregnating metal, as the latter forms part of the steel or iron.

The final operation consists in polishing the articles by rotating apparatus, suitable to the form of the blade or other articles treated, but the objects which are impregnated by means of the hot bath of molten silver are tempered again when taken out of said bath, and before they are definitely polished. The articles so prepared, whether originally made of steel, iron, bronze, German silver, or any other metal or composition capable of bearing the heat to which they will have to be exposed, according

to his invention became remarkably hard and sonorous, these qualities resulting from the impregnation above described. He has described the process with respect to knife blades as an example, but desires it to be understood that other articles or objects of many kinds may be treated thereby with great advantage; for instance the process may be applied with great advantage to many utensils in which inoxidizability is a valuable quality, and may also be applied for many industrial or manufacturing purposes. The process is not costly, and the difference in the price of articles so made, and that of well finished goods manufactured in the ordinary manner, is amply compensated for by the saving in time and wear in cleaning. Thus, a knife-blade made as above described only requires to be cleaned by means of soft linen or wash-leather to preserve its appearance and silver polish. It can, moreover, be sharpened, and will keep its edge for as long a time as a steel knife would do.

**MORE DAYLIGHT.**—The London *Building and Engineering Times* describes a system designed to give light in passages and portions of offices, stores and other parts of buildings where, from close packing and a want of space, sunshine scarcely penetrates. It consists in inserting semi-prismatic lens-lights in such positions as will allow refracted daylight to be admitted, even on a dull and cloudy day. These semi-prismatic lights are made in a variety of forms; they consist of cast-iron frames into which are glazed either rectangular or hexagonal semi-prismatic reflecting lenses made from clear crystal glass, so placed that the light is reflected through the lens at such an angle as to slope from the front to the back of wherever they are *in situ*. At the distance of 60 ft. from the front of the premises, we were able to read the smallest print, and the only source of light in a cellar used as a storeroom was that which passed through one of the pavement lights under notice. The same principle has been applied in an improved safety coal plate, in flagged or asphalt pavements, and these are being extensively used in the streets of the metropolis; also in the form of sloping boards instead of window sashes, and giving as much protection as unsightly iron railings, besides affording ventilation, while they reflect additional light into basements outside of which they are fixed.

**RAILROAD SYSTEM OF MEXICO.**—The St. Louis *Republican* publishes, on what it claims to be good authority, some important facts in regard to railroad construction in Mexico. It appears that the Mexican government has granted very liberal subsidies to a narrow-gauge railroad to be built, which will be a continuation of the Denver and Rio Grande road, to the city of Mexico, and from thence westward to the Pacific ocean, at or near Manzanillo. The work is to be commenced immediately at the city of Mexico, and to be pushed with all reasonable dispatch both north and west. The road, when completed, will be about 2,000 miles long, and will be known as the Mexican Central. The *Republican* also has information from a high official of the Denver and Rio Grande company that that road will be completed to Laredo within two years. The line is now finished to Santa Cruz, N. M., and being vigorously pushed southward. An incomplete road from Corpus Christi, Texas, at the mouth of the Rio Grande to Laredo has been purchased by the Denver and Rio Grande company, and a 40-mile gap in it will be finished as speedily as the grading and track laying can be accomplished. When this work is done it will afford connection between Laredo and Galveston, New Orleans, other Gulf ports, and be a great aid in the transportation of supplies of iron, etc., to the contractors on the Mexican line proper.

**INFLUENCE OF HARDNESS ON MAGNETIZED STEEL.**—It has been proved by Herren Strouhal and Barns, from experiments in which steel wire was treated so as to show all degrees of hardness between the glass-hard and annealed states, that the thermo-electric and galvanic properties of steel vary with the degree of hardness in a very sensitive manner. Their researches, which were published in Wiedemann's *Annalen*, throw some useful light on the nature of the annealing process, and on the magnetic behavior of steel in relation to its hardness and other properties, a subject which fully deserves the closest investigation.

**A CABLE-LAYING SHIP** possibly represents the highest development of marine engineering, for a hitch in the machinery may mean the failure of the expedition. An instance of the perfection which has been reached has been furnished by the cable-ship, *Kangaroo*, which ran recently from New Zealand to St. Vincent without once stopping the engines. The distance of 9,500 miles, supposing about 16 miles to be run every hour, represents continuous work for 25 days—a fairly sufficient testimonial to the excellence of the machinery.

**NEW USE FOR COPPER.**—It is proposed to make use of large quantities of copper in the production of phosphor-bronze, from which telegraph wires may be made. Prof. E. Bede, formerly of the Liege University, highly recommends phosphor-bronze for wires, it having four times the ductility of iron and being from three to four times as strong as steel. Aerial lines are easily inspected, but are liable to accident, while underground lines, while almost exempt from accident, are difficult of inspection.

## SCIENTIFIC PROGRESS.

## The Future Life.

Years ago, in the days of Bishop Butler, very much stress was laid upon the analogies in nature, illustrating and supporting the idea of a future life, and the treatises then written were models of intellectual power and patient research. A great impression was produced, not only upon uneducated, but educated minds. Since that period science has progressed with giant strides, and at every step has so largely added to the list of striking analogies or incidental proofs, that the illustrations of early date seem few in number and dwarfed in proportion and force. The idea of an unseen immaterial existence involves also the idea of unseen activities and correspondences in the rayless realm. The most stolid of such cannot fail to be impressed with the beautiful analogies which recent scientific discovery affords.

Do we not every day converse with unseen friends a long distance away? Do we not recognize their familiar voices in homes separated from us by rivers, woods and mountains? These voices come out of the darkness, guided by a frail wire which science provides as a pathway. Even the curtain of night is drawn about us, the voices are heard, and we have not the shadow of a doubt of their integrity and identity. And further, have we not analogies of sight which startle us by their significance? Is it not true that when abroad we are open to the view of unseen observers long distances from us, and our every act and movement known? The excellence of optical instruments is such that we have seen the motion of lips of persons in conversation while sitting on a house balcony three miles distant, the observed, of course, wholly unconscious of being seen by anyone.

If our friends in this life, dead to us (hidden as they are by the shroud of space), can be seen, and we can hear their voices, their shouts of laughter, the words of the hymns they sing, the cries of the little ones in the mother's arms, is it very absurd to anticipate a time when those dead to us by the dissolution of the body may, by some unknown telephony, send to us voices from a realm close at hand, but hidden from mortal vision? We have no proofs to offer that this realm of the departed of this home of the soul is close at hand, but it is certainly more reasonable to adopt this hypothesis than the popular one of a material world or place somewhere afar off in the depths of space. One view seems possible, the other absurd.—*Boston Journal of Chemistry.*

**A NEW METHOD.**—In a recent report to the British Parliament, Dr. Angus Smith claims to have discovered a new method of examining the atmospheric conditions of manufacturing towns. He expects to be able to show how much a town or country suffers loss of light, and to find "how much this loss affects the health of plants, and it may be of animals and of man." The test is a chemical one, and rests upon the fact that when iodide of potassium in solution is treated with a small quantity of nitric acid a change takes place when the mixture is brought to the light, and the amount of iodine that is set free can be measured with great exactness. This is the germ of a process for measuring light, which the scientists will call a photometric process, that may be developed in time into a valuable agent for the examination of climate. There can be, Dr. Smith suggests, no real progress in sanitary economy without the full knowledge to be obtained by the examination of the air. He has found ammonia upon every object he has examined, indoors and out of doors, in the towns and in the country. Ammonia, it is believed, may be an index of decayed matter. By suspending a piece of glass anywhere, and after a while washing the outer surface with pure water by means of a spray bottle, and applying a Nessler solution to the washing, the presence and quantity of ammonia are ascertained. This Dr. Smith hopes to make "a ready popular test for air, a test for sewer-gas, for overcrowding, for cleanliness of habitations, and even of furniture, as well as for smoke and all the sources of ammonia."

**NEW CONCLUSIONS.—THE PHOTOPHONE.**—The opinion is gaining ground, especially among French savants, that the musical sounds produced by Prof. Bell in disks of various substances, such as mica, India rubber, metal and wood, by holding them in the path of a rapidly interrupted beam of light, are really due to heat and not to light. Radiophonic notes, such is the new term, have been obtained by M. Mercadier from ordinary gas lamps without employing lenses to concentrate the interrupted beam, by simply bringing the receiving disk near the source. Even a plate of copper heated to a bright red heat produced very distinct musical tones, which gradually died away as the plate cooled to a dull red followed by obscurity. The fact that when the receiving disks were coated with silver on the side next the light the effects were feeble, and that when coated with absorbent lamplack they were strong, would seem to tell against Prof. Bell's conclusion that the sounds were due to light. It is a curious fact that when the radiometer was first brought out by Dr. Crookes he intimated his belief that its rotation was due to the impact of light waves; but heat is now known to be the cause of the motion.

## Pictures by Telegraph.

It certainly is a fact that, by a recent invention, pictures of all kinds can now be sent by telegraph. Colors can not be transmitted, but all pictures which result from combinations of light and shade, such as photographs, steel engravings, wood-cut prints, India-ink sketches, pen sketches and crayon pictures are reproduced in five minutes, at a distance of 100 miles, with astonishing accuracy. Checks have been so faithfully copied by this process that the copy has been honored at the bank without a question. New York newspapers have been reproduced in Philadelphia entire—the image being sent by telegraph, and every faintest dot and blemish brought out on paper. We should be glad to tell the readers of the *Queen* exactly how this is done, but it is by a chemical process so complicated as to defy explanation in ordinary terms. *Nature* (the recognized authority in science in England), comes as near as possible, perhaps, when it says:

"In the transmitter the image was focused on a revolving cylinder, to which a selenium cell is attached. At the other end of the wire a platinum point presses against the surface of sensitive paper prepared by passing it through a strong solution of equal parts of iodide of potassium and water. The arrangement is such that the selenium cell, by intercepting the current, causes a white spot to appear on the receiver corresponding in shape and size to the picture focused on the transmitting cylinder. The experiments are as yet crude, but full of promise." This is not quite intelligent to the average reader, because the facts of the case call for scientific terms, and cannot be expressed in popular phraseology. But the important fact is that the pictures are sent; that photographs are admirably reproduced at a distance; and that, if the promise of the invention is fulfilled, a New York paper will soon be reprinted in Chicago on the very day, and perhaps the very hour, of issue. So much that is incredible has been made a fact during the last half century that he must be a bold man who ventures to place a boundary to the possible achievements of scientific ingenuity in this wonderful age.—*N. Y. American Queen.*

**EGYPTIAN ANTIQUITIES.—IMPORTANT DISCOVERY.**—The *Egyptian Gazette* says: "At the last meeting of the Egyptian Institute, on the 4th inst., a letter was read from Brugsch Pasha describing the recent discovery at Sakkarah of some inscriptions in two ruined pyramids. It is well known that the means for identifying the royal personages for whom pyramids were built are extremely scanty, but the hieroglyphics in question preserve the names of Papy, of the sixth dynasty, and of his son Merenra. They include also the private name of Merenra, which it seems was Horemhaf, but there is a slight doubt as to the correctness of this reading. The ruins have little of the pyramidal shape left, having been opened and destroyed at a remote period. Although they figure on the maps, both of Perring and Lepsius, neither of those explorers seem to have thought them worth examining. Funeral inscriptions of the time of the pyramid builders have not previously been found, and these, which are so far unique, are of the highest interest in the history of the religion. A mummy, believed to be that of the younger king, was taken out, and, we hear, was safely brought to Boolak, the only mummy of a king of the pyramid period yet discovered, with the single exception of that of Mycerinus, which is in the British Museum. We hope shortly to be able to offer some further details of this remarkable archaeological event."

**PURIFICATION OF EXPENDED LUBRICATING OIL.**—It is found that the purification of expended lubricating oil is not only practicable as a scientific process, but may be made a matter of economical advantage as well. One of the means resorted to for accomplishing this is to procure a tube of about 16 gallons capacity, supplied with one spigot at the bottom and one about four inches above; into this are placed 6½ quarts of boiling water, and there are then introduced 2,000 grains of chromate of potash, 1,540 of soda, 1,920 of chloride of calcium, and 3,840 of common salt. To this are added 50 quarts of oil to be purified; stir thoroughly for five or ten minutes, and after standing perfectly quiet for a week in a warm place, the clear oil is drawn off by the upper spigot. This plan is found to produce on the whole the most satisfactory result by the most simple means.

**SUBMARINE PHOTOGRAPHY.**—Improvements are said to have been made in submarine photographic apparatus, by means of which views have been taken near Glasgow, at a depth of ten fathoms underneath the water. One of these views, taken in the bay of that city, shows distinctly a sandy bottom, with a large number of boulders covered with seaweed, and an old anchor; also, in the shade, three mooring cables, belonging to small yachts.

**HEADS DIMINISHING.**—British heads are gradually growing smaller. Within the last quarter of a century the dimensions of the head have shrunk on an average one-seventh of an inch—at least so says a paper recently read before the Bristol Naturalist Society.

**SAXIFRAGE.**—Messrs. Garreau and Machelart, Paris, have extracted from the stems of the saxifrage, tannin, starch and a new proximate principle, hergenine, which possesses valuable medicinal properties, and may rank between quinine and salicine.



**SPANISH FLINT MINES**—Cor. Georgetown Gazette, April 30: G. H. Roelke & Sons are making all necessary arrangements for working their mine, which is a good one. They inform me that their clean-up for last winter amounted to \$900. With the rig they have now, they will clean-up five times that amount next winter. We hear encouraging reports of the Gopher mine, near Kelsey. Another good mine is Mr. Jensen's claim. It is reported that this mine has been handed to N. D. Burlington and G. Alderman, for \$10,000, \$5,000 down. If the Cal. W. & M. Co. would bring in a ditch on the ridge, scores of claims could be located and worked in this vicinity. The Parsons mine is found east of the shaft of the Parsons mine is now extended to the 2d level, and the work of drifting begun. We learn from good authority that Alabama Bar, on Middle Fork is to be worked on an extensive scale. The Cal. W. & M. Co. has a force of 33 men at work enlarging the Pilot hill ditch from Fraser flat to I. E. Terry's. Armstrong, Lee & Clark will commence sinking on the Au-



next mine next week. This mine is in Garden Valley district.

**CHAPARRAL MINE.**—*Mountain Democrat*, April 30: The Thursday John James completed his contract for running 50 ft of tunnel into the Chaparral mine. The tunnel is now 125 ft, at which point the ledge is large and strong, beautifully "ribbed," and occasional striae, made as the tunnel progressed, have proven that its entire length has been run in good milling ore. A contract for another 50 ft has been let to Mr. James, who will keep light along, and as there is still a strong "couge" of black galena in the face of the tunnel, there is every assurance that he will still be able to make rapid headway. A short time he will make a test, crushing of 100 or 200 tons of ore from their "Big Chunk" ledge.

## MARIPOSA.

**MINE AND HORRITON.**—*Mariposa Gazette*: We learn that there were new men representing capital, who were negotiating several mines in this section. Messrs. Robinson and Bell are engaged in opening and developing the old French mine, later known by other names. It is situated near the road leading from Hornitos to Indian Gulch. We believe that they have applied for a patent on this mine. There is an abundance of quartz, and here can be no doubt but what it contains strata of pay ore. The Washington is said to have struck a big thing in the 1400 level.

## NEVADA.

**BEAUTIFUL NGORITS.**—*Nevada Transcript*, April 23: "Six-finger hand," a Mongolian who has two thumbs on his right hand, sold at the Citizens bank yesterday two of the finest gold nuggets ever brought into the camp. They were worth about \$300. One of them originally weighed some 15 ounces, but had been cut into several pieces as if to disguise its shape. The Chinaman said he found them in a canyon near Omega while crisscrossing the gold had formed in crystallized quartz that afterwards became decomposed.

**SARGENT AND JACOBS' MINE.**—*Transcript*, April 20: For 50 or 80 ft in the drift of Sargent & Jacobs' gravel mine at Indian Hill, has been passing over a bar in the channel, and as a natural result, had a moderate amount of gold been taken out in the meantime. Within the past two days, however, signs have been encountered that show the end of the bar to be close at hand.

**NEW QUARTZ MINE.**—*Wm. H. Smith* is erecting steam hoisting works on the old Gallows Flat claim, adjoining the new cemetery on the northwest, and will be ready to begin sinking within the next 10 days. Some \$50,000 has been taken out of this ledge—known by many as the Eagle—above water level by the former owners. The incline is now down about 75 ft; Mr. Smith will sink 100 ft more (the machinery has a capacity of 500 ft), then drift. The ledge is a small one, from 8 to 14 inches, but of high grade, often going upwards of \$100 a ton.

**RICH COPPER ORE AT SPENCEVILLE.**—*Grass Valley Union*, April 23: It is reported that copper ore has been struck at Spenceville, in the county of Nevada, in this county, that will smelt fully 40% in copper. The ore is a carbonate found in the mine have ranged from 5% to 8%, and the copper has been extracted by the leaching process, rendering the ore friable by burning it in piles of about 80 tons each, and then obtaining a copper solution by leaching the burned ore in vats containing water. The copper from this solution is precipitated by being placed in large rotating tanks, capable of holding 3,000 gallons each, and is marketed as cement, which resembles a powder. The process is a cheap one, and although the ore has been of low grade it could be manipulated at a profit. If the ore in the mine is now to assume as high a grade as 40% it cannot be worked by the leaching process, but smelting will have to be substituted, which would require the erection of suitable furnaces.

## PLACER.

**NEW REDUCTION WORKS.**—*Placer Herald*, April 30: We paid a visit the other day to the Placer County reduction works, recently erected by White & Maltman, near the Turnpike, about a mile below Auburn, and found them in full blast. They are at present running on a batch of about 70 or 80 tons from the Julian, and as soon as the ore is through they have a lot to come in from the St. Patrick. Their appliances seem to be complete, and everything seems to work to a charm. They guarantee 85% of the fine assayed, but usually save more. The works have a capacity of 25 tons in 24 hours, which is probably sufficient for all present demands. Mr. Maltman has personal supervision of the works, and that is a thorough master of the business is true.

**HILL TUNNEL.**—We paid a visit last Wednesday to the scene of the mouth of the projected big Duncan Hill tunnel, and only a glance at the work thus far done is enough to convince one of the contemplated thoroughness and permanency of the enterprise. The fine large open cut leading to the face of the tunnel, with its even granite walls, indicates that it is made to last, and the size of the tunnel just being started, shows conclusively that it is intended for extensive use. Mr. E. W. Roberts is superintendent of this enterprise.

**CRUTCHER'S MINE.**—Crutcher keeps steadily at work on the quartz seams in his garden, and every little while makes some remarkably rich strikes. Last Wednesday he struck some of the richest rock he has yet had, and took out several hundred dollars in a few hours. Thus far his finds have been in spots, though the spots have been remarkably rich. The rock seems to be nearly horizontal and from 8 to 10 ft deep. There is a big, well-defined ledge near by, though he finds the gold in what seems to be a kind of float rock.

**THE IRON WORKS.**—The idea of iron reduction works in Placer county is now a reality. The furnace near Clipper Gap, under the supervision of Mr. J. M. White, is turning out pigs by the cord, and has every prospect for a successful summer's work. We have a sample of the iron, and though not a judge ourselves, those who pretend to be pronounce it first-class. It seems certainly to have a very fine grain, and a toughness far beyond the average of pig iron.

## PLUMAS.

**NEW TUNNEL.**—*National*, April 30: Frank Vere in forms us that he will commence tunneling operations at Crescent hill during the next week, and is confident that he is on the right track for a big bonanza in gravel. Crescent hill is on the southern slope of the mountain ridge, between here and Middle Fork, and is within a short distance of the celebrated Claremont Hill gravel mines.

## SAN DIEGO.

**TEST.**—*Colton Semi-Tropic*, April 30: The Pinacate stamp mill made a test of 5 tons of ore the other day, and cleaned up out of the lot over \$400. An excellent beginning, and one that is intended for extensive use. Mr. E. W. Roberts is superintendent of this enterprise.

## SHASTA.

**COPPER CITY MINES.**—*Cor. Redding Independent*: Under the judicious management of Messrs. Potter & Hall the extra mill is paying well. The new power is working splendidly, and is sufficient for 40 stamps having 120 ft pressure, and 20 ft suction. The wheel makes about 1500 revolutions per minute. A climb to the mines occupied an afternoon. The Jennie June shows up well, but is worked at a great disadvantage on account of the necessity of one so many times being hauled over a short tunnel will remedy that. Work is being done on the Bully Hill and the mines are good, though no ore is being taken out at present. The finest tunnel in the hill is at Northern Light. It is greatly to be hoped that this mine may prove to be all that is anticipated, as a mill will be at once erected. Copper City is remarkably healthy. The two stores seem to be doing a good business. A reduction mill is being put out of the localities, and stopped at Furnaceville for dinner. It seems a pity that so fine a mill should remain idle. Furnaceville is almost deserted.

## SIERRA.

**GOLD BLUFF.**—*Mountain Messenger*, April 30: The gold mill cleaned up \$6,000 the last run, although working

to a great disadvantage. The owners are now in condition to get rock more advantageously and cheaply than before. It is, we learn, the intention to put up a larger mill very soon.

**THE WILBURN CON. CO.'S** shaft was down among large boulders, the last we heard, and in fine-looking gravel. It was supposed they were near bedrock. The quartz gravel is steadily becoming coarser, and is 9 ft deep in the shaft. One boulder was 5 ft thick. The prospects are now very encouraging.

**SUBSTR.**—All Bits and partner took out a very large piece of gold a short time ago in their diggings below the 21 mill.

Work is being prosecuted on P. Grant's claims in Cariboo ravine.

**BONDED.**—The Bush quartz mine, below Loganville, is said to have been bonded by S. V. Mooney for \$50,000. It is also rumored that work will be immediately commenced to develop it.

## TRINITY.

**HYDRAULIC ELEVATOR.**—*Trinity Journal*, April 30: Mr. John Yule, superintendent of the McGillivray mines, has returned from his recent visit to Butte county, where he went to see the improved hydraulic gravel elevator in actual operation. He is enthusiastic in praise of the machine, saying that it does his work easily and well, and is a great improvement on the old ones. The strong probabilities are that Mr. Yule will have an elevator at work in this county in a very short time; and if it works as well as reported, many will soon be introduced here.

**SPLENDID PROSPECT.**—From parties who recently visited the locality we learn that the recent strike made by the Gibson Bros., bids fair to prove an extensive one. The rock continues rich at a depth of 10 ft, and the ledge shows a width of 4 ft. All the rock taken out will pay to work, there being no waste whatever. The mine is on the Shasta county side of the Deadwood and French gulch divide.

## TUOLUMNE.

**CHLORINATING.**—*Tuolumne Independent*, April 30: The superintendent of the Olsen mine has gone to San Francisco for the purpose, it is understood, of negotiating for the putting up of chlorinating works for the roasting of the sulphuret ore developing in such large quantities in the mine. Gilkey, tired of hauling ore, has sold his buildings and retired to his home among the mountains. J. Olsen, with his magnificent teams, now does the hauling, and is capable of supplying them with 30 tons of ore a day, if necessary.

It is reported, on good authority, that the Ferguson mine has been sold to a company in London. The strike in the Rife mine is not so extensive (as yet) as the San Francisco man, whom Hunter gave a \$2 specimen to, made it out to be; but he hopes soon to come to the main body of gold. Chris Schultz has struck very rich ore in the Lynch mine, above Sonora, and upon which he is building a mill.

**NEW MILL.**—*Union Democrat*, April 30: Mr. H. H. Eames is erecting a 5-stamp mill on the Street & Groes mines, which he has bonded at Tuttle town. There is a lot of enterprise and thrift about Mr. Eames' works which betokens permanence. A new boarding-house and several dwelling houses are to be put up soon, which, with the half-dozen buildings recently finished, will make quite a town. The buildings are all neatly whitewashed, everything looks clean and workmanlike.

## NEVADA.

### WASHOE DISTRICT.

**SIERRA NEVADA.**—*Enterprise*, May 2: On the 2500 level winze No. 2 has been sunk and timbered 20 ft; total depth, 57 ft. The north lateral drift on the 2500 level has been extended 40 ft. During the week we have raised 194,400-2000 tons of ore.

**MEXICAN.**—On the 2500 level the joint Union Consolidated winze has been sunk and timbered 10 ft, and a hoisting engine has been placed at the top. The joint Ophir east winze has been sunk and timbered 6 ft and the 2500 level has been put in.

**GRINA.**—On the 2500 level the joint California winze has been sunk and timbered 17 ft, the joint Mexican east winze has been sunk and timbered 6 ft and the 2500 station set has been put in. A pump is being put in at the 2700 station. Repairing the incline at the 1900 station.

**CONSOLIDATED VIRGINIA.**—During the past week 414 tons of ore, assaying \$18.65, have been extracted and sent to the mills. On the 2500 level the progress in the Best and Belcher upraise was 17 ft. On the 2500 level the joint California west drift to the C. and C. shaft has been extended 28 ft, and the joint California east drift from the C. and C. shaft has been advanced 23 ft.

**UNION SHAFT.**—The shaft has been sunk and timbered 9 ft during the past week. Are repairing the shaft between the 1600 and 2500 stations.

**HALL & NORCROSS.**—The west crosscut on the 2400 level has been advanced 46 ft. Its face is a mixture of quartz and porphyry. A section of pump-rock has parted, but it will be repaired by to-morrow.

**UTAH.**—Since last report the incline has been sunk and timbered 12 ft; total distance below the 2150 level, 177 ft (on the slope). The South drift, on the 2150 level, has been extended 22 ft.

**UNION CON.**—On the 2500 level the joint Mexican winze has been sunk and timbered 10 ft, and a hoisting engine has been placed in position at its top. The joint Sierra Nevada winze has been sunk and timbered 18 ft.

**ALTA.**—During the past week have sunk and timbered the shaft 31½ ft; total depth, 1,971 ft. No change in the geological character of the ground and no increase of water. All the material for the bobsis received and most of it is in place.

**ALTA.**—During the past week 498 tons of ore, assaying \$18.55 per ton, have been extracted and sent to the mills. On the 2500 level the joint Con. Virginia west drift to the C. & C. shaft has been extended 23 ft, and the joint Con. Virginia east drift from the C. & C. shaft has been extended 23 ft.

### CANDELARIA DISTRICT.

**NORTHERN BELLE.**—*True Fissure*, April 30: The first and second levels look finely, and are producing the usual quantity of ore. The eleventh or adit level still continues to hold its own remarkably well. All the stops are yielding as well as ever, showing no diminutive either as regards quantity or quality of ore produced. There is now being extracted and sent to the mill 88 tons of ore daily. Both mills are running steadily. The bullion shipments for the week ending April 27, were \$98,407.37.

**MOUNT DIABLO.**—The north crosscut gives good ore from the raise, though mixed with waste. On the second level the west drift is in low grade ore, advance 10 ft. The winze from the ft of Callison winze will be connected with the west drift on the third level in a few days.

### ESMERALDA DISTRICT.

**WHAT IS GOING ON.**—*Herald*, April 30: The feeling existing here and abroad in regard to the mines of this camp is flattering indeed, and the growing interest gives us the greatest encouragement that the district is at last in a fair way to get what it has long needed and never had—a fair show, a thorough prospecting. The developments made in the Centennial and Cortez, and the appearance of ore from the Silver Hill, prove conclusively that the precious metal is here in abundance, and all that is needed to make Aurora bloom again is work and milling facilities. We are going to have the mills, and work is now being prosecuted from Silver Hill to New Esmeralda, a distance of 5 miles. For years the mines have lain almost idle, and of course nothing was developed, but a little work has made a vast change in the appearance of things. It is not till the mill gets up a mine that is second to none on this coast—the Cortez. It has proven the New Esmeralda a bonanza. It has shown the Centennial to be fabulously rich, and demonstrated wherever work has been done that fair to good milling ore abounds everywhere. Such being the case, we expect to see mines in active operation from one end of the district to the other before the summer is over.

## EUREKA DISTRICT.

**REMOVED STRIKE IN ALBION.**—*Eureka Sentinel*, April 23: A rumor has been afloat about the streets for several days of an important find by the Albion Co. As the story runs, the Richmond, just before mentioned, had discovered an immense ore body in a drift in what is known as Albion No. 1. Ascertaining that they had crossed over the Albion line, they withdrew and plugged up the drift. In making surveys for the purpose of the late trial, the Albion people are alleged to have discovered this blind drift and explored it to its full length, with the result already indicated.

### GRANTSVILLE DISTRICT.

**BROOKLYN.**—*Grantsville Bonanza*, April 30: In the Brooklyn a fine body of high grade ore has been developed. This is the same body of ore that was only broken into some time ago. The old stops are still as productive as ever.

**THE ALEXANDER.**—The Alexander stopes look bigger than ever, and a large body of ore has been uncovered in the back, between Nos. 5 and 6. The water has increased some during the past week.

**THE LEFFLER.**—Very fine indications are now appearing in the Leffler mine, with every prospect of uncovering a fine body of chlorite at any moment.

### OSCEOLA DISTRICT.

**WORK.**—*Pioche Record*, April 30: Work will be pushed ahead at Osceola this summer. Godhe & Hampton, who own 20 placer claims in that district, intend bringing water into their claims and working them.

### PIOCHE DISTRICT.

**ORK.**—*Pioche Record*, April 23: There was a rumor circulating around during the week that ore from the black ledge had been put through the furnace and that it proved good smelting ore and yielded well in silver. This is all a mistake. There was a ton and a quarter of base ore from the Raymond & Ely, which resembled the ore of the black ledge very closely, which was put through the furnace, and caused the report. There is now about 40 tons of black ledge ore at Bullionville, and 20 tons more in the ore-house here, but there is not any likelihood of the Bullionville smelting works touching it as long as they can get all the high-grade ore they can handle.

**BULLION.**—*Pioche Record*, April 30: \$6,288.74 in bullion shipped by Wells, Fargo & Co.'s Express during the week.

This mill of the Meadow Valley Co. is now running steadily and turning out considerable bullion.

The train made one trip to Bullionville during the week, bringing down a load of ore. This cleans up pretty much all the ore extracted by chloriders, and the cars will not probably make another trip for a week or two.

**DAY COMPANY.**—The work at the mine is being pushed and everything is being put in such shape that large amounts of ore can be extracted and hoisted at short notice. There are large quantities of ore and charcoal being piled on the dump of the furnace at Bristol.

## ARIZONA.

**CLOSE ITEMS.**—*Silver Belt*, April 30: Mr. Winn has made a very important strike, on a new ledge, within a short distance of the Emmazetta mine. He tells us that the ledge is large and well defined. J. C. Lennon has returned from New York with the intention of fixing up matters for the Nugget Co., and resuming work on the mine. The Old Dominion Copper Co. are going to erect a 30 ton smelter at once. The Supt. has secured one of the best furnace sites in the district. He has plenty of water the whole season, and wood is within three miles. The smelters will be so situated that the ore can be run in cars directly to them from the mines. George Scott, of this place, has sold to Thomas H. Mason, of Boston, the Interceptor Copper mine, one mile north of Globe, for \$7,000. George Scott will resume work on the Pioneer mine during the first of the coming week. The large mine is looking well, and the owners contemplate increasing their working force. The Mineral Creek mine is about to be handled properly at last. We know from others that there is a very large ledge on the property, and we are of the opinion, based upon our knowledge of the district, that careful prospecting on it would develop good paying ore. There are over 200 tons of ore now on the dump. It would seem from the number of new strikes being made that prospecting is only in its infancy in this district. We have recorded several this week, and the latest reaches us just as we go to press. Dr. McDonnell has struck a 6 ft vein of ore, on the Illinois location, that goes 50% in copper, and is rich in silver also.

**COPPER.**—*Tombstone Nugget*, April 30: The Clifton copper mines are reported to be increased in richness. Large quantities of very high grade ore have recently been shipped. The first of the coming week. The large mine is looking well, and the owners contemplate increasing their working force. The Mineral Creek mine is about to be handled properly at last. We know from others that there is a very large ledge on the property, and we are of the opinion, based upon our knowledge of the district, that careful prospecting on it would develop good paying ore. There are over 200 tons of ore now on the dump. It would seem from the number of new strikes being made that prospecting is only in its infancy in this district. We have recorded several this week, and the latest reaches us just as we go to press. Dr. McDonnell has struck a 6 ft vein of ore, on the Illinois location, that goes 50% in copper, and is rich in silver also.

**SILVER KING.**—*Bulletin*, April 30: The Silver King is pouring out a Silver current sure enough. She has shipped over \$75,000 worth of bullion during this month, and will ship over \$30,000 more before the month closes. Globe City, or rather Gila county, has been shipping extensively also. Altho George reports having discovered some valuable springs in the upper San Simon valley, about 25 miles from Cave creek, affording sufficient water for 1,000 head of stock, and that the region round about is entirely free from brush or shrubs and is eminently adapted for sheep.

### IDAHO.

**WOOD RIVER.**—The following notes are from an interview with Mr. Mute (just returned from Wood River), in the Salt Lake Tribune: The climate is all that could be desired for a northern country. The snow was off at Bellevue, and up the river it was clear of snow for 12 miles. As a mining country I think it is the best I ever saw in my life. It is not overrated as far as mineral wealth is concerned. The labor market is over supplied, but the field is great for good prospectors. The need of the country is capital. I think the mines will furnish ore enough to keep the smelters going. There is one smelter lying on the roadside at Bellevue awaiting lumber. It will be put up soon as the saw mills can furnish the material. There are merchants enough to do the business at present, and the opening is not good. Money is scarce and the business credit is a good deal tighter than it was. Smelters are built and the mines more fully developed. Bellevue is the leading town now, containing about 400 citizens and 100 or 200 houses. It will grow as fast as material can be procured. There are other towns up the river which have bright prospects, being nearer the mines than Bellevue. There is a big rush; about 400 have gone by the Kelton stage and about as many by the Blackfoot route. A great many are going in by their own conveyance. The people think the rush is too great for their present facilities. They expect a second Leadville as soon as they can accommodate the people. Capital is what the country wants to make it one of the finest mining regions on the Pacific coast. The mines are rich and they all improve at depth. I noticed a great deal of ore out, and shipments to Salt Lake City will begin in a short time. The roads are improving and Salt Lake can look for a large amount of rich ore from Wood River. Take it all in all, Wood River is a good country, and as a mining country is all that it has been represented.

### MONTANA.

**STRIKE ON THE MOULTON.**—*Inter-Mountain*, April 23: Yesterday the force of men employed in excavating for the Moulton mill, struck one of the largest bodies of ore ever opened up in the district. The ledge, which was

partly covered up by surface deposits, was to-day demonstrated to be a total width of 40 ft. It appears to be divided into two sections, separated by a porphyry horse about two ft. in thickness. The north section is a black manganese, the assay value of which is unknown at the present writing, and the other shows ore identical in appearance with that taken from above the water line in the Alice. The quality is exceptionally good. An assay made yesterday returned 388 ounces in silver and 14 ounces in gold—a total valuation per ton of \$532 40. The ore across the entire width of the vein is of good workable quality, and Superintendent Bowers has been ordered to strike it in the Butte, are in high splits. It is likely that a shaft will be at once started to prospect the bonanza.

## NEW MEXICO.

**SILVER IN A WELL.**—*Tucson Citizen*, April 29: The railroad company in boring for water at Lordsburg, New Mexico, made a mineral discovery of wonderful promise. The well was dug and cribbed for 90 ft from the surface, and quite a ledge of excellent ore was developed. From this point the 8-inch drill was set at work and run down 450 ft, bringing up at that depth in a vein of almost pure silver, a sample of which was sent to the Citizen office. The well was abandoned and privilege given to the railroad employees at Lordsburg to locate the singularly discovered mine, which they did not hesitate to do at once. The lucky boys fully expect to find an immense bonanza in the bottom of the well, and their spirits have correspondingly risen.

**BLACK RANGER.**—*Cor. Nevada Transcript*: I have been in the mines about six weeks and have examined all the principal locations. The claimed mineral belt lies in the foothills on the eastern slope of the Black Range—a range of tolerably high mountains some hundred miles or more long. The mineral belt is about 40 miles long and runs from one to five miles wide, and abounds in quartz ledges running to every point of the compass and dipping at every angle. The country is well watered by many streams, while the hills, mountains and valleys are covered with fair to good timber and a great abundance of firewood. The principal timber is yellow pine, spruce, juniper, black walnut, white ash and nut pine. The whole country abounds with fine grazing all the year. The climate is certainly excellent, with the genuine California nights. The mines? Well there is the rub. I have seen no mines since I came to this camp. Neither do I see any prospects that promise anything for the future. While many of the hill tops show ledges, the heads of the creeks show none, while the croppings show the lower workings are innocent of the contaminating lacer. But talk with a "wanderer" who is the happy possessor of some hundred locations, and Arapahoe and bluish for lack of proficiency and Alladin would be a pauper. Tell all the boys to come to the Black Range. There is some very good looking country south and west of here, and I have no doubt there are also some good mines there.

## OREGON.

**BLACKWELL.**—*Oregon Sentinel*, April 30: Barksdale & Cunningham have struck very rich quartz in their tunnel in the Blackwell district. The quartz, which is quite yellow with free gold, was struck in the top of the tunnel, is nearly a ft wide, and the owners feel sanguine that they have a valuable pocket. The rock just discovered yields, in a hard mortar, \$24 to the pound.

**PROSPECT.**—*Supt. Ennis*, of the Sterling hydraulic, has picked off about acres of very rich ore, and the present season, with a good prospect for over 2 months' more of a full head of water. Work on the ditch extension is going steadily on, and next winter 3 giants will be used.

**YELMINE.**—The claim of Saltmarsh, Klum & Co. is evidently yielding well, as last week; 2 pieces of gold were picked up in the ground sluice, one weighing \$14 and the other \$30. Work of cleaning up in the mine has not yet commenced.

**GOOD YIELD.**—The claim of Hosmer, Lance & Duffield, on Foot's creek, must have some rich pay in it. It will average 20 ft in depth, and every cubic ft will yield 25 cents. Only a quarter acre has been worked off, yielding over \$10,000.

**NOTES.**—Miners on Coyote creek have generally cleaned up, with fair returns for their labor. John Montgomery has cleaned up \$1,600 for the season's work on the ground leased from the Dean Bros. at Willow Springs. The large hydraulic mines of the Blue Gravel and English companies, at Galice, have discontinued piping on account of failure of water. The Schump tunnel is still being vigorously pushed ahead. It is yet in hard rock, with about 50 ft to run before the lode can be struck. Green Bros., of Galice creek, are still engaged on a new tunnel, but are continually washing quartz which yields from \$10 to \$50 per ton. Alex. Watts, of Williams, is working a new extension of operations for the season. He runs a small hydraulic, and averaged \$12 per day for the season. Sturgis & Beckner are now engaged in cleaning up on Jackson creek. Their ground is panning out well, and within the past 2 weeks they have picked up about \$300 on the hedrock. J. T. Layton, of Applegate, has sent for 1,500 ft of 15-inch hydraulic pipe, and will lay down the old belt. The new belt will be laid down in a new manner, and to be yielding very satisfactorily. A new tunnel to strike the Holman ledge, between the branches of Jackson creek, at a greater depth is spoken of. Were that hill in Nevada or California it would have been honeycombed with tunnels long ago.

## UTAH.

**THE CARBONATE.**—*Southern Utah Times*, April 23: From this mine we have a very favorable report, which is to the effect that the heat ore ever found in the mine has been taken out of the raise above west 4 on the second level during the past week. At the concentrating works of this company the new East Canyon concentrator is working very satisfactorily, according to President Bigelow's statement, is extracting 20 ounces silver and 10% of lead from the slimes which are too fine to work in the dry machines. By means of the saving process applied to the machine by Supt. Farnham, very little valuable water is wasted.

**SOME SHAUNTE MINES.**—Average samples of ore from the Gallinipper, Magnolia and Rose mines, owned by J. R. Lindsay, were assayed by Mr. A. S. Bigelow last week, and found to contain 100 to 150 ounces silver and from 5% to 6% lead. There is more than 125 tons of this ore on the dumps at these mines.

**NICKEL** plating of machinery is now becoming quite common, even with large pieces. In England, the other day three large cylinder covers for enclosed engines were nickel-plated and polished, the largest cover weighing 1½ tons, and being 6 ft. 6 inches in diameter.

**MILLING ORES.**—We are unavoidably compelled to omit from this issue the continuation of Mr. Rothwell's article on the cost of "Milling Silver Ores in Utah and Nevada." It will appear in our next.

**AMONG THE CITY OF CHESTER'S** steerage passengers Sunday, at New York, were 1,099 Irishmen and women. This is the largest number of persons ever brought from that country at one time, and by far the greater proportion of these are members of the Irish Land League.

The consolidation of the city and county governments at Virginia and Gold Hill, Nev., was effected on Monday without opposition. There was much talk of contesting, but all ended without any serious result. Taxes on all property (including mines) in this county will be less than heretofore.



### The Miner's Soliloquy.

To go or not to go; that is the question;  
Whether 'tis wiser in the honest miner  
To work persistently on fissure veins,  
Or load a burro and absquatulate,  
And by migration quit them. To go, to skip—  
That's all—and by yamooing say he strikes  
The trail that leads to wealth and fills his purse  
With glittering lucre; 'tis a consummation  
Too gorgeous to expect. To go, to skip,  
To toll, perchance to fall—aye, there's the rub;  
For in that untrodden field what woe may come  
When he has shuffled off the last red cent?  
What man would pay the gorgeous royalty,  
Or bear the pangs of minimum assays,  
When he himself might his own fortune make  
With pick and shovel? Who would those trials bear?  
To toll and wrestle with a doubtful lease,  
But that the fear of running out of funds,  
Before he strikes the contract, curbs his will  
And rather make him work the streak he has  
Than tackle one that may be twice as lean.  
Experience makes philosophers of all,  
And oft a little wholesome hesitation  
Bears fairer fruit than reckless resolution;  
Thus enterprise needs scarce and silver  
Are hurst in the bud. Soft, you now,  
Angelic reader. Nymph of the hush-house table,  
Be all my wants remembered!

—Tombstone Epitaph.

### Annual Expenditures on Claims.

The following facts regarding a recent dispute at Tombstone, Arizona, will be of interest to mine owners:

"The Boh Ingersoll claim was located September 10, 1878. The owners did \$100 worth of work in 1878, immediately following the location, but did not do any work in 1879, being under the impression that the work done in 1878 carried them through the year 1879. This would have been a correct conclusion for them to draw had not Congress passed an act on January 22, 1880, providing that \$100 worth of work should be done within each calendar year. As no work was done in 1879, this left the Boh Ingersoll ground open to relocation, a chance that was eagerly jumped at by certain parties in Tombstone, and the ground was located by half a dozen rival claimants. The Boh Ingersoll people contended that Congress had no power to pass a retroactive law; that their claim having been located in 1878 could not be effected by a law passed in 1880. The jumpers claimed that Congress had absolute power over the mineral domain; that the miners had only a possessory title, which could be defeated at any time by failure to comply with Congressional laws, and that as long as the title was in the Government, the Government could make any kind of regulation it chose in regard to the land. The matter was finally referred to the Commissioner of the General Land Office. A copy of the Commissioner's letter from the original in the hands of one of the lawyers in this case is as follows:

GENERAL LAND OFFICE,

WASHINGTON, D. C., February 23, 1881.

Sir: I am in receipt of your letter of February 8, 1881, in regard to the expenditures necessary to be made on the Boh Ingersoll lode. It appears that the Boh Ingersoll claim was located in September, 1878, and that \$100 worth of work was done by the locators during September, 1878. No work was done in 1879 by the locators or their grantees, nor in 1880, until December 11th of that year. Prior to that date, viz., during August and September, 1880, the ground was relocated by the Pinto, Moonlight and Midnight claims. On December 11, 1880, the locators of the Boh Ingersoll took forcible possession of the claim, and are now holding it. By the amendment to the mining act, approved January 22, 1880, it was provided:

SECTION 2. That Section 2,324 of the Revised Statutes of the United States be amended by adding the following words: *Provided*, That the period within which the work required to be done annually on all unpatented mineral claims shall commence on the 1st of January succeeding the date of location of such claim, and this section shall apply to all claims located since the 10th day of May, A. D. 1872.

Whatever work, therefore, is done prior to the January succeeding the location of the claim, cannot be considered or credited to the year following such January. In the present case no work was done during the calendar year of 1879, and, as just remarked, expenditures before that date cannot be considered. The mine then became subject to relocation on January 1, 1880. If it was actually relocated before the original owners resumed work, such relocation is good, and the claimants of the Ingersoll, in taking forcible possession of the claim, were trespassers, and would not, under the present rulings, be recognized by this office.

Very respectfully,

J. A. WILLIAMSON, Commissioner.

It will be seen by this letter that the Commissioner holds that the annual expenditure must be made within each year, commencing on January 1st, and any expenditures made before January 1st do not count. As this is the ruling by which the Department will be guided in the future, owners of all mines located since May 10, 1872, should be sure that their annual work has been done within each year. If it has not been done they should rectify the error at once by a new location.

It was supposed that the decision of the Commissioner would settle the question, and so it did in the minds of good lawyers. But the Boh Ingersoll people laughed at it, and announced their intention to contest the Commissioner's ruling in the courts, and put fighting men on their mine. After a few days of warlike threats better counsels prevailed, and they acknowledged the justice of the Pinto, Midnight and Moonlight claims, and settled with the owners, or, in parlance of the honest miner, "took them into camp."

### Volatilization of Gold.

It has been stated by some authors that there is never much loss of gold in roasting ores, unless the roasting is performed too rapidly, and that the addition of salt makes no difference in this respect. I differ with them on this point, even when the statement is supported by so formidable a name as that of Plattner. But I think that illustrious chemist would yield to the logic of a pecuniary loss of \$3,000, especially when hacked by other facts.

When I first entered on the business of gold chlorination on a large scale, I had a class of concentrations to treat which, while consisting chiefly of iron pyrites, and presenting no visible peculiarity, had nevertheless baffled many old operators, a fact of which I was not at the time aware. The ore was roasted in a three-hearth reverberatory furnace, with the addition of from 1% to 2% of salt, on account of the presence in it of a considerable quantity of silver.

I was surprised to find that although the assays of the tailings were satisfactory, the gold, when collected, fell alarmingly short of the results which I had guaranteed, and I was of course obliged to make up the deficit.

Relying on the statement referred to, which I found in the only handbook on the subject within my reach, and being then a novice in this branch of metallurgy, I did not dream that a serious loss was taking place in the roasting furnace, especially as I had an expert metallurgist in reduced circumstances employed on the roasting, who had no more suspicion of the truth than I had.

Finding that I was sustaining some loss by inadequate room for the gold solution, and having consequently to draw the liquid from the gold-tub too soon after precipitation, I thought that I should find the whole loss to be in the leaching and precipitating department, and each time that an improvement was made, expected better results, so that I was led on from trial to trial, until the total loss reached the sum named.

I am not quite certain that I should ever have discovered the truth, but for the following accident: One day, I so far checked the draft of the furnace as to cause some fumes to come through the air holes and working doors, and a yellow sublimate on the masonry attracted my attention. On examination I found the sublimate to be very rich in gold, although there was none too to be seen in it by the most careful washing. It also contained iron perchloride, and copper chloride, with some lead and other substances. This aroused my suspicion, and I at once did what I ought to have done sooner.

Knowing that the material could be roasted with little or no loss, if no salt was used, because some assays had been made in that way, I weighed two half ounces of a sample, and roasted them in the muffle side by side, under precisely the same conditions, except that to one of them I added 4% of salt. The roasting was purposely pushed to an extreme as to heat and time, and when the two tests were assayed, under exactly similar conditions, that which was salted was found to contain less than half as much gold as the unsalted one.

I then took some light fluffly sublimate from the due of the roasting furnace, an assay of which gave me a value of some \$600 per ton, chiefly gold. The quantity of this material was, however, very small, and the bulk of the matter in the dust chamber was not much richer than the average of the ore treated, a circumstance which indicates that the gold was actually to a great extent volatilized in some not easily condensable form. I also found that the ore sustained a loss of weight in roasting, equal to about 18%, consequently the roasted ore ought to have been more than 18% richer than before roasting, which was not the case.

If this is not considered to be sufficient proof that gold may be volatilized in the roasting of some ores with salt, the deficiency is supplied by the fact that, as soon as I made the necessary change by reserving the salt until the nearly dead roasting of the ore was finished, not only did the roasted ore assay 20% richer than when raw, but the yield overran my guarantee, while the tailings nevertheless contained considerably more gold than before.

The moral of this is, never to neglect any precaution in the way of tests and assays, nor to place implicit reliance on rules laid down, or inferences drawn by others who have worked under different conditions.

I afterwards found that a very small quantity of salt, not more than three lbs. to the ton, might be mixed with the crude ore without detriment to the gold, and with decided advantage to the extraction of the silver.—*Aaron's Leaching Gold and Silver Ores.*

### Altar, Mexico.

Considerable attention is just now being turned to the mines of Altar, Mexico, especially by people in Arizona. Altar is a mining town of about 2,500 inhabitants, and was formerly called Santa Gertrudis del Altar, and it is sometimes now called Guadalupe. It is watered by a small stream called Rio de la Asuncion, branching from the Altar or Magdalena river. The stream is insufficient for irrigation in the dry season. The town is situated near the banks of the stream upon a plain about 80 miles northeast from the gulf coast, and about 100 miles from La Libertad, which is located south-east on the coast. The plains on the west are dry and sandy, and are a part of the great Col-

orado desert, which extends down the coast near Lohos, about 50 miles distant in a southwest direction. The discovery of mines of gold and silver in the vicinity of Altar gave it a great impetus at one period in its history. It is mostly built of adobe houses. The town is garrisoned by a few soldiers, and the streets are irregular. East of the town are situated ranchos exceedingly fertile and abundantly watered. The place is distant from Santa Cruz about 120 miles, which lies in a northeast direction by way of Magdalena and Arispe. Santa Magdalena is about 70 miles distant. The latter town is also called San Ignacio, and is located due east of Altar in a beautiful valley. The number of inhabitants is about 3,000. The stage connects at Magdalena with Hermosillo on the southeast and thence to Guaymas, and on the north with Tucson by way of Tombstone and Benson, Arizona.

### Nitrate of Soda.

The discovery of nitrate of soda near Brown's station, Nev., may lead to results vastly important to the Pacific slope and to the country at large. This valuable salt has been found in extensive beds only in the province of Tarapaca, among the hills which skirt the coast of Peru. These beds extend over a territory of 150 miles. The hills are covered with a light, sandy marl, mixed with minute fragments of shell. When this covering yields and cracks beneath the feet, it indicates the presence of nitrate of soda. On digging a foot or two the salt is found, overlaid usually by a stratum of common salt. Portions of this nitrate of soda are of a pure sugar-like whiteness, other portions being colored reddish brown, lemon yellow and gray. A large portion of the provincials find employment in extracting and refining the salt, which is shipped from Iquique. In 1837 the exportation aggregated 120,000 quintals, England consuming two-thirds and France one-third. The nitrate mines have long been the chief wealth of that section of the country, and their importance can well be imagined, when it is remembered that the Peru-Chilean war grew out of disputes over the revenues of those fields.

Some time ago the State Mineralogist of California, Mr. Hanks, received samples of crystallized nitrate of soda from this county. Tests prove the salt to be of good quality and exceedingly valuable. Mr. Hanks advises prospecting the desert regions, where evidences of volcanic action are present, or where alkalies are plentiful. The test is simple and admissible of no mistake. The suspected crystal or salt should be reduced to a powder, and intimately mixed with an equal proportion of charcoal. This, when placed upon a heated iron, a red hot shovel for instance, will deflagrate—will flash like powder—the fire running from grain to grain in a similar manner. The compound is powder minus sulphur. Where it is suspected that the earth is strongly impregnated with the nitrate, take a kettle and fill it two-thirds full of the earth and the remainder with water. Heat it, stirring the while, and when thoroughly mixed and heated, so that the water will have become saturated with the salt, allow the solution to settle. The liquid poured off, the mud will contain the salt, which is secured by evaporating. The crystal is then tested as before. The test is accurate, and may be applied by any one without apparatus.

A good nitrate mine is more valuable than a gold mine. The cost of extracting the salt at Tarapaca, where it is principally secured by the process of lixiviation above described, is as follows: Reckoning for each 100 lbs., labor is set down at 62 cents; fuel, 38 cents; tools and powder when blasting is necessary, 12 cents; transportation to Iquique, 75 cents, a total of about \$1.87.

In quantity, the salt sells for about \$8 the hundred lbs. The profit is apparent. The uses to which nitrate of soda is put are numerous. It is substituted for nitrate of potash—saltpeter—to which it is closely allied, in preserving meats as in curing hams, pickling pork and corned beef, the manufacture of nitric acid and various other purposes. Owing to its delinquent properties, it has not been employed in the manufacture of gun powder, although it is not known but in some varieties of explosives it might be employed, if indeed it is not already. Careful search over the regions given over to arid plains and lava beds may result in the discovery of hitherto unexplored mines of wealth.

### Stockholders' Rights.

It is safe to conclude that when a mining company declines to make known the condition of its property or affairs to its stockholders, or to the public, there is something afloat that is not what it should be. A mining exchange holds the following sensible view of the rights of stockholders: "The stockholders of a mining or other stock company have just as much right to know all about the company's affairs as has the president, secretary or any other member of the organization. Every stockholder in a mining company is a member of the company, just as surely as is every owner in a commercial firm a member of that firm. It is true that the stockholder in a mining company votes for the officers of the company, and in doing so authorizes the officers to act for him in their several official capacities, but no further. The officers of a mining company properly are the servants of the company, and have no more right to know what is taking place at the mines, or in other departments of the company's affairs than has the smallest stockholder."

### Swelling the List of Preserved Products.

It is gratifying to see that the list of California preserved products is constantly increasing. There are a hundred things which form items in the great commercial wealth of the world, which can be produced here, and though the revenue from each may be comparatively small, the aggregate will be large, and our income as a State increased to that amount. Fortunately the day of small things is advancing in California, and the reign of the little economies will enrich the mass of the people far more than the era of great speculation through which we have passed. These remarks are suggested by an item in the Los Angeles Express, which gives information obtained from a representative of the San Jose Packing Co., who is now in the southern counties. It is stated that this house has been experimenting for the past five years on the preservation of the citron and other similar fruits of commerce, and they are now ready to put their products on the market. They have erected a building with tanks and apparatus at large outlay and brought a man from France to superintend this branch of their work. They will use citrons, pinalos, bitter oranges, Chinese lemons and that class of fruits which our horticulturists have been in the habit of considering worthless, paying therefor \$1 per hundred lbs. in Los Angeles. They also expect to manufacture *glace*, or candied almonds, walnuts, apricots and cherries. The almonds and walnuts are picked when about half matured—when they can be readily sliced through with a knife—and pickled, shell and all. The San Jose Co. have an order for 20,000 lbs. of these products to be shipped to London, and they expect to employ their new apparatus in this work almost exclusively during the coming season.

### Mining on Snake River.

Mr. L. B. Foster was in town on Saturday, and informed us that his company, composed of Charley Haines, formerly division agent on the overland road, J. W. Wilson, John Irvine and himself, have been mining on a bar on Snake river, four miles below the old Dorsey ranch, and were making \$25 per day to the hand. They let a couple of boys go on to a portion of the bar on the claim that was what they called a high bar, and rock five days for a little grub stake, and they took out \$40. The water they had been using was from an irrigating ditch, which belongs to Isaac Culp, the present proprietor of the Dorsey ranch, and he is now using the water, which lets their mining out in that place for this summer, but they have equally as good a bar on the other side of the river, below the mouth of Castle creek, where they are now going to mine, and will put in a larger machine for saving the gold than they had up at the Dorsey place, and expect to do better than they have been doing.

Mr. Foster says the gold is a little coarser than it is up at Salmon Falls, and they're trouble has been, in all the Snake river mining, to save the gold. He thinks that all the mines on this river have improved their machines for saving the gold, and they are doing better and will take out more gold this season than they have heretofore. The company will take water from Castle creek to work their lower mines, and will have plenty of it. They own a large bar claim of 160 acres on this side of the river, nearly opposite Castle creek, that will pay equally as well as the Dorsey claims.—*Idaho Statesman.*

### Silver Belt.

Prospecting in the vicinity of Iron City, about 40 miles north of the Reef, Utah, has been quietly going on for some weeks, and although reports have been frequently received from those who have struck prospects, but little attention has been attracted to the district, owing to the fact that it was abandoned some years ago. Recent developments, however, prove the old-timer's theory incorrect, and the most flattering reports are now being fully substantiated by specimens of the rock and the certificates of well known assayers.

From Mr. J. D. Hickox, who returned to the Reef yesterday, we learn that at a meeting of the miners and prospectors held last Saturday a new district was organized, to which the name of Silver Belt was given, and that Mr. Joseph Watson was elected Mining Recorder. Mr. Hickox brought with him specimens of rock taken from a ledge in which he is interested which assay from \$200 to \$600 in silver and which have not yet been tested for gold. He will return immediately, and the first shipment of ore from that district will probably be made inside of a week.

From Pinto district, hordinger on the Silver Belt, the most favorable reports are also received, and the development being prosecuted at present is said to be highly satisfactory to the owners of the properties. A boom may reasonably be expected in this section during the coming summer.—*Silver Reef Miner.*

CHLORIDING.—Chloriding is being prosecuted vigorously in different parts of the camp, particularly on the River reefs. Flattering reports come to us from the lessees on the Duffin, Toquerville and Giffried mines. Coffman & Rusk, Miller & Co., Westover & Co. and others on the Duffin have paying leases, and McGavin & Martin on the Toquerville and Burnett & Smith on the Giffried are reported to be taking out high grade ore.—*Silver Reef Miner.*



## Wood River.

From a letter in the Idaho Statesman, we take the following items: Hailey, this rival of Leadville, is beginning to loom up; 20 houses being in process of construction, and \$6 lots sold, with the proviso that buildings shall be erected on them within 60 days. This location is the best on Wood river for a town; being at the mouth of Croy gulch, in which are located the only developed mines, except the Falk, Wolters & Chase property, of the Lower Wood River country. The site is on the upland about one-fourth of a mile from the river, five miles from Bellevue and 12 from Ketchum. Its advantages are: central location, easy of access, available smelter sites, good water, and a reasonable show to get good title to the property bought. Already, one jobbing general merchandising, one drug, two hardware, four general merchandising and one clothing store have goods on the way, and will be ready for business within 40 days; two 25-cent saloons are in full blast, and one four-hit restaurant.

Hailey is the terminus of the Blackfoot & Wood River Stage line, and the Goose Creek & Wood River branch of the Kelton and The Dalles line. The Kelton (Goose Creek) route, is the best for persons coming here via the Central and Union Pacific railroads, being a much better road and as short as the Blackfoot route. From Boise City and eastern Oregon, for people coming by their own conveyance, take the route up the Malad river, which leaves the Overland road near Salmon Falls, on Snake river, and strikes the Goose Creek stage road at the Cottonwoods on Wood river 30 miles from Hailey.

## Smelters.

Only one smelter is located as yet, that of Mr. D. Falk, of Boise City. Mr. Falk stated yesterday that it would be in operation by the middle of May. It is being erected on Indian creek, two miles above Hailey.

## Croy Gulch Mines.

The Bullion, May Flower and Idahoan are all taking out ore, having nearly 200 men employed, and more good miners wanted; the bullion company having advertised at this place and at Bellevue this week for 40 miners. The practical miners now in this section prefer to take their chances prospecting rather than \$4 a day in the mines.

## Rich Strike.

One of the big discoveries since my arrival in the country, is that made by Mr. Owen Riley in Croy gulch last Monday. It shows eight feet of \$100 galena on the face of the ledge, and is said to give good promise of being one of the big mines of this section. This property is located about half a mile from Mr. Croy's ranch, three miles from here. Other good locations are being made every day.

## Building Material.

Boise lumber and saw-mill men could make a big thing by rushing into this country a million feet of building material, there being nothing here except cottonwood logs; not a bundle of shingles, nor a foot of lumber on the river. There is a saw-mill at Ketchum, but it is a rattle-trap affair, and not working.

## Grain and Hay.

Teamsters say it is almost impossible to get a sack of barley in any place on the river, and hay is selling at \$45 a ton, and little to be had at that.

## A New Quartz Mill.

Mr. M. F. Lockwood, of Centerville, Boise county, informs us that he has invented and secured a patent for a quartz mill that will be of great advantage to miners. It is a one-stamp mill built in parts or sections, so that it can be carried on pack mules over mountains where there are no roads, and no other means of conveyance. Mr. Lockwood claims that there are many miners in this and in other Territories who are not able to work mines which they have discovered, on account of the great expense in building roads and erecting mills of the old style. He claims to have overcome this difficulty by constructing a mill that can be put up in any place and at a small expense. He has so much confidence in the success of his mill that he offers to put it up on the installment plan, all ready to run, for those who wish to purchase. He sends the following description of his mill:

1st. The stem weighs 850 pounds, and runs 250 drops per minute, and revolves when the shoe and die come together, which causes it to grind as well as to crush. The motor has three discharges, and is made in sections, so as to be taken to pieces and packed on animals where there are no roads. The stem is the heaviest piece, but when naked weighs 600 lbs. and can be packed on two animals. The cam is so constructed as to operate the stem both up and down; by forcing it downward it makes it strike a blow twice the height of the stem. The drop is six inches, and only requires a five-horse power to turn it. It has a self-feeder, and will crush from 8 to 12 tons ordinary ore in 24 hours. Mr. Lockwood will also furnish a water wheel power, small and simple, that can be run by a common hydraulic, carrying 50 inches of water, with a 60 or 70 ft. pressure. Mr. Lockwood claims that his mill is a great improvement over any mill that has ever been built, both in a saving of expense and in its execution of good work. Persons who desire to purchase or want more full information, can address Mr. M. F. Lockwood, at Centerville, Boise county, Idaho. —Idaho Statesman.

## USEFUL INFORMATION.

**SALTING MEAT.**—Salted meat is far less nourishing than fresh, and far less wholesome. We will endeavor to explain why. The preservation of meat by means of salt has been practiced from time immemorial, and is one of the simplest methods for this purpose. It depends for its efficiency upon the desiccation or drying of the tissues, as the salt used for this purpose enters slowly into solution, deriving the moisture it requires for this purpose from the fluids of the flesh. Hence it is that when dry salt is strewn upon fresh lean meat, it gradually disappears in the form of a liquid brine. As the flesh loses its natural juice, the fibers contract and the meat lessens in bulk. The action of the salt, if a large quantity is applied, penetrates deeply, and as much as one-third of the natural juice of the meat is often forced out of it. The preservation of meat by means of salt, therefore, may be explained to depend upon the separation of water, upon the exclusion of air, and upon the saturation with salt of the juices remaining in the meat. But meat, though preserved in this manner against putrefaction, suffers a notable loss of its normal nutritive properties, inasmuch as the brine which gradually forms about it, contains probably one-third or one-half of the nutritive substances (albumen, kreatin, phosphoric acid, potash, etc.) of the flesh, which are extracted along with the juices. These are the very substances which are more completely extracted by digestion with water, as in making beef tea or broth; and in proportion as these constituents are extracted, they diminish the nutritive properties of the meat. The change in the constitution of the meat by salting has been shown by Leibig to be greater than that produced by cooking, and the loss of nutritive value considerably greater; for in cooking, the nutritive albumen, etc., is simply coagulated in the fibers and retained, while in salting, the extracted substances enter the brine and are lost. Not only does salting greatly diminish the nutritive value of meat, but those who are compelled to subsist upon it almost exclusively for any length of time, are generally afflicted with scurvy, a fact which proves its unwholesomeness, and which doubtless stands in close relation with the loss of the nutritive elements, as vegetable substances which are capable of supplying what the meat has lost, are found to be the best preventative of, and the best remedy against, the disease. —Manufacturer and Builder.

**CLEANSING ZINC, TIN AND LEAD.**—Zinc is cleansed by dipping for a few moments only (as the alkali quickly attacks the metal) in the hot potash-lye, rinsing and dipping into water containing about 10% of sulphuric acid for a few minutes. Rinse in plenty of hot water, and, if necessary, scour with pumice stone powder and a stiff brush, moistened with a weak cyanide solution or scratch brush. The last operation is especially useful when parts have been united with tin solder. Tin, lead, and the alloys of these metals are more difficult to cleanse perfectly than zinc or iron. Scour rapidly with the hot potash and brush, rinse quickly and brush, or dress with a piece of soft clean wood. It is very difficult to obtain a satisfactory deposit of gold or silver directly upon these metals or their alloys. The results are much better if a coating of pure copper is interposed.

**LIQUID WOOD.**—We are informed, says the Northwestern Lumberman, that sawdust can be converted into "liquid wood" and afterward into a flexible and almost indestructible mass, which, when incorporated with animal matter, rolled and dried, can be used for the most delicate impressions, as well as for the formation of solid and durable articles. To accomplish this, the method pursued is to immerse the dust of any kind of wood in diluted sulphuric acid sufficiently strong to affect the fibers for some days, the finer parts being passed through a sieve, well stirred, and allowed to settle. The liquid is drained from the sediment and the latter mixed with a proportionate quantity of animal matter, similar to that used for glue; the mass is then rolled, packed in molds and allowed to dry.

**PARAFFIN** as a preservative of wood has lately been highly recommended, especially with the view of preserving it against the destructive influences of dampness, acids and alkalis. For this purpose, it is suggested to immerse the well-dried wood in a solution of the paraffin in petroleum ether (benzene) or carbon disulphide. The wood absorbs a large quantity of the material, and the evaporation of the solvent leaves the paraffin behind in the pores of the wood. In employing this recipe, care should be taken to guard against the possibility of the ignition or explosion of the materials. A good preventive of combustion would be a thorough coating with a silicate paint.

**ASHES AS EMERY.**—A manufacturer whose business requires the use of large amounts of emery, has been trying an experiment with the ashes of anthracite coal, and he affirms that he has obtained good results from the use of ashes as a substitute for the finer grade of emery. He takes ashes and saturates them with water, the liquid being poured off after standing an hour or two, then being poured off again, and so until he obtains several grades, down to a substitute for emery flour. When dried, the deposit cuts readily and leaves a satisfactory surface.

**PREPARING FLOOR FOR DANCING.**—If planed well, paper the floor with sand paper, then wax it with beeswax and turpentine. To prepare it, melt in an iron pot two or three pounds of common yellow wax; when melted, take the pot of the fire and allow the wax to cool a little, then add one pint of turpentine for each pound of wax, well mix and wash the boards with the mixture, using a large paint brush; the wax must now be well worked in the boards by friction. The surplus wax may be wiped off with a stiff cloth; beeswax and turpentine, with friction, is the best plan extant; in fact, at the present day is still in vogue in many of the chateaux in the south of France.

**A NEW ART PROCESS.**—A curious device, whereby pictures of various kinds are burnt out on a piece of ordinary-looking rose-colored paper, has been brought out by a Berlin merchant, Herr Bergel. You apply a glowing match at two finely perforated points, and the sparks communicated then begin gradually to move over the paper, working out the picture. Neither leaves its proper path, nor injures the paper beyond, and when the end of the path is reached, the spark goes out. A negative and positive are thus obtained, after the manner of silhouettes. The contrivance proves highly entertaining, and may be employed for educational purposes.

**CEMENT FOR RUBBER.**—Powdered shellac is softened in ten times its weight of strong water of ammonia, whereby a transparent mass is obtained, which becomes fluid after keeping some little time without the use of hot water. In three or four weeks the mixture is perfectly liquid, and when applied it will be found to soften the rubber. As soon as the ammonia evaporates the rubber hardens again—it is said quite firmly—and thus becomes impervious both to gases and to liquids. For cementing sheet rubber, or rubber material in any shape, to metal, glass and other smooth surfaces, the cement is highly recommended.

**GROWTH OF TREES.**—As the result of observations, and from the testimony of reliable men, the following is about the average growth in 12 years of the leading desirable varieties of hard wood when planted in belts or groves and cultivated: White maple, 1 foot in diameter and 30 ft. high; ash, leaf maple or hox elder, 1 foot in diameter and 20 ft. high; white willow, 1 1/2 ft. in diameter and 40 ft. high; yellow willow, 1 1/2 ft. in diameter and 35 ft. high; Lomhardy poplar, 10 inches in diameter and 40 ft. high; blue and white ash, 10 inches in diameter and 25 ft. high; black walnut and butternut, 10 inches in diameter and 20 ft. high.

## GOOD HEALTH.

## Sneezing.

"God bless you!" is the common expression of Europeans when you sneeze in their presence; sneezing having been considered in ancient times the result of a demoniac possession, to avert the evil influence they invoke a blessing. But the true philosophy of a sneeze is set forth in an article in the Popular Science Monthly for April under the heading "What is a Cold?" The whole of it is worth reading, but we have only room to transcribe what relates to sneezing.

"Sneezing in catarrh is a method nature adopts to stimulate the prostrate nervous center, and thus enable it to reassert its proper control over the blood supply to the part; indeed, it will be found that the effects of being exposed to a draught of cold air are often completely destroyed by a succession of sneezes. Of course, nature does not always immediately succeed in these efforts; but, when she does not, the shock from which the nervous center suffers gradually passes away, and the blood-vessels again come under the control of the little nerves which regulate their caliber, and so the catarrh disappears in a few hours, or at most in a few days. It sometimes happens that the shock from the cold air acting upon the nervous center is of such severity that the consequent inflammation is intense enough to check the secretion of mucus altogether, and in consequence the mucous membrane is dry as well as inflamed, and the suffering very much intensified."

**FEAR ON DISEASE.**—It is said that while the plague was raging in Buenos Ayres the grave-diggers here charmed lives. Of the 300 men so employed, not one died of the disease. It has often been noticed that during the prevalence of pestilential diseases physicians, undertakers, nurses and grave-diggers, whose business compelled constant liability to infection, have usually escaped in a far greater ratio than their numbers would warrant. The "charm" of this immunity from the prevailing scourge is very simple. They are not scared. They are positive to the disease, and repel its attacks. Fear is a great ally of death. Whoever is afraid of disease is in a negative condition, and really invites its approach. And thus it is the world over. The brave die but once, while cowards die many times. Much unnecessary alarm exists in every community in regard to many diseases. We are, it is true, all liable to sickness and death. But if we are all sober, cleanly and brave of heart, we need have no fear of disease of body or mind.

**TOBACCO DISEASE.**—A writer in Boyce's Anvil testifies as follows respecting tobacco as a cause of disease: "For eleven years my right hand was sorely afflicted with a most loathsome disease. Its first appearance was shortly after my debut as a telegraph operator, and consisted of four or five very small, watery pimples. They increased in number, however, till they could hardly be counted, and each day became more and more troublesome. Instead of a thin, watery fluid, they now began to exude a thick, offensive matter, and the physicians called it an aggravated case of salt rheum. My hand and wrist became one mass of sores and scabs. I spent some \$300 doctoring with physicians and patent medicines, yet nothing seemed to give much relief; but in three months after tobacco was stopped, the disease began to disappear, and to-day there is not a particle of it to be seen about me."

**A NEW PORK PARASITE.**—A Berlin microscopist has recently discovered a new parasite in pork, which is described as "a small leech-like worm," which has not been heretofore known. The worms are found crawling about among the muscular fibers, sometimes moving very actively. A German microscopical journal of recent date contains a full description of the worms with illustrations. Notwithstanding, pork and beans still holds its place as a standard article of diet among the masses, and ham and sausage are in as great demand as ever. It is evident that the pork-loving world have become reconciled to a "diet of worms." We prefer to eschew the scavenger; let those who will, chew him.

**EARACHE.**—A remedy for this dreadful torture is recommended by a correspondent of the London Lancet, as follows: "In the course of practice you will often be called upon to attend a case of earache. This means, pathologically speaking, acute inflammation of the membrana tympani. Now, in such a case you may quickly subdue the inflammation, relieve the patient from the excruciating pain he is suffering, and save him, perhaps, from subsequent confirmed deafness. The treatment from which such a very desirable result may be obtained is similar to that which you will find so beneficial in analogous cases of eye disease; viz.: leeches behind the ear, hydrarg. c. creta and belladonna powders, with warm fomentations."

In searching for a vegetable remedy, Dr. L. D. Buckley suggests, in the New York Medical Journal, the gelsemium, the yellow (false) jessamine, the heartful climbing evergreen which produces the large, very fragrant yellow flowers, from the relief it affords as a nervous sedative to the skin, might be useful. He has experimented with it very successfully, and after prescribing it for two or three years, mainly on adults suffering from eczema, he feels prepared to advise it as a means for the relief of itching in certain cases. He has used the tincture of the drug only, giving it in 10-drop doses to begin with, and, when no relief was obtained, repeating the remedy in 12 or 15-drop doses at intervals of half an hour, until results were obtained or until a dram or so had been taken in two hours.

**TREATMENT FOR A FELON.**—Take of soft lye soap and flaxseed-meal, or corn-meal, a sufficient quantity, stirring the meal in slowly and thoroughly, so as to form a salve or poultice. Envelope the finger in this, applying snugly, to bring it in close contact. Renew the poultice every 12 to 24 hours. Don't try every prescription you may hear of. Depend on this. It will, if applied in time, absorb the disease; if adopted later, it will bring it to a small "head" (if too far advanced to be "scattered," when it may be picked almost painlessly. —Therapeutic Gazette.

**NEW REMEDY FOR PARASITES.**—Physicians are often troubled to give relief to the symptom of itching which so frequently forms a prominent feature in certain skin diseases, and the most varied local measures are often used with the result of aggravating the local irritation. The list of internal remedies used for allaying this distressing condition is a limited one, and from it chloral and bromide of potassium stand out almost alone; but the objections to the continued use of these are too obvious to require mention.

**THE CAT AS A PEST DISTRIBUTOR.**—The domestic cat is again charged with spreading disease, this time by the physicians of a district in Sullivan county, this State, where small-pox is epidemic. In several cases the proof is pretty strong that house cats carried the pest, and owners of cats have been warned to keep them from roaming about. —Exchange.

**A BEAUTIFUL COMPLIMENT TO THE PHYSICIAN.**—I dare not place any gift, however beautiful, or any success, however brilliant, above the talent or the skill which can relieve a single pang, and the self-devotion which lays them at the feet of the humblest fellow creature. —Oliver Wendell Holmes.

**THE LEMON VERBENA.**—The well-known lemon verbena is systematically gathered in Spain, where it is regarded as a fine stomachic and cordial, used in the form of a decoction. It is said that if it be used one need never suffer from flutulence, nervousness, diarrhoea or loss of appetite.





W. B. EWER..... SENIOR EDITOR.

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## Passing Events.

In looking over the exchanges of the week, the editor of this journal was very much impressed with the numerous "strikes" which are occurring in California. All over the State comes news of progress and advancement. Old mines are being opened. New mines are being found. But most important of all is the renewed proof that an economical era has set in, and that legitimate mining is being carried on as it should be, at the same expense, proportionately, as any other business. The good bullion producing mines of the State are being worked quietly and without any notoriety or fuss, but they are none the less prosperous for this.

Arizona, Wood River and Alaska are still attracting attention, particularly the Idaho district. Hundreds of men are going in there. A gentleman who visited the region not long since, tells us that there are some 2,000 claims in that part of the country already taken up.

Arizona is still attracting large numbers of men, and is producing bullion in a better proportion than it was last year.

New Mexico is scarcely prospected enough to say very much about yet. Bad reports come mixed with good ones. Some people write disparagingly of New Mexico, Wood River, Arizona and Alaska, but it probably depends very much on a man's luck what reports he sends back about any new region.

A CATHOLIC Congress will be held in Madrid in October, which will be attended by Catholic notabilities from every part of the world.

## Marine Dredging.

Dr. Gustav Eisen wrote some time since to Professor Davidson, President of the California Academy of Sciences, stating that he wished to sell the outfit for collections, which he had brought from Stockholm, in the expectation of being able to make dredgings along our coast.

Prof. Davidson at once called upon Mr. Gerstle, of the Alaska Commercial Co., and stated the case to him, and asked that he and his associates would purchase the outfit and present it to the California Academy of Sciences. This he agreed to do upon the condition that Prof. Davidson should personally examine the articles of the outfit, and decide upon the fairness of the price named. With Mr. Harford, the director of the Museum, he performed that duty, and, upon reporting to Mr. Gerstle, the money was immediately paid and forwarded to Dr. Eisen.

The outfit is very complete, and embraces dredges, trawls, large copper tanks for holding large and numerous specimens, with the larger tank full of alcohol; boxes with large numbers of specimen bottles of various sizes, tins for holding material for exchanges, soldering tools, etc., etc.

Most of this material comes very opportunely into immediate use in the work of the Academy. It is hoped that the dredging apparatus will also come into use before long. Neither our coast or bay has been dredged for specimens, which seems strange when we remember that the field is a fresh one. There is a good deal of room for scientific work all along the coast, and especially is it desirable that a scientific school of zoology should be instituted at some such locality as Monterey bay. That at Naples, visited by the President of the Academy in 1875, has become not only a model of its class, but has drawn to it students and investigators from all parts of Europe. Agassiz established the school at Penikese, but it failed at his death. John Hopkins' University is promoting the study at Baltimore, and the U. S. Coast and Geodetic Survey is studying the development and natural history of the oyster at Chesapeake bay. A number of small schools have been established along the Atlantic coast, where people go for a few weeks or more in summer and study natural history.

The Alaska Commercial Company, which presented the articles before referred to, to the Academy, deserve recognition for their services to science. They have interested themselves in collecting on the northern coasts, specimens of such character as they supposed would be of value here. Some magnificent specimens of the fur seal, male, female and young, were given by them to the Academy. Also numerous specimens of Alent implements and clothe. At their building they have a collection relating to the archaeology and zoology of Alaska, systematized by Captain Niebaum. This has been classified by one of our fellow-members, and it is understood will be presented to our Academy at no far distant day.

## Garibaldi South Mine.

The Garibaldi South mine, situated in Calaveras county, 10 miles above Copperopolis, has been opened by a tunnel 150 ft. long, crossing the vein at right angles; and a drift on the vein 80 ft. has been run, showing the vein to be 15 ft. wide, trending north 47° west, and dipping 45° north, lying between diorite on the foot and auriferous elate on the hanging wall. The average of the ore in free gold is from \$7 to \$9 per ton, with 2% to 3% of sulphurets, assaying from \$200 to \$250 per ton. Ore has been found in this mine assaying free gold over \$5,000 per ton, but the average ore is about \$10 per ton.

There are over 10,000 tons of ore above the drift ready to be stoped down. A water power sufficient to run 80 stamps belongs to the property, the water being free. There are 40 acres of land, a fine mill site, timber in abundance, lumber at \$25 per thousand, which, with other benefits, makes it possible to mine and mill at \$2.50 per ton.

The "auriferous slates" above the hanging walls are valued at \$12 to \$15 per ton. They are from 5% to 10% sulphurets, assaying from \$143 upwards per ton. The width of these slates is not known beyond 10 ft., as the crosscut has not shown the barren or country rock. Enough is known to warrant the erection of a 40-stamp mill.

**EXTINGUISHING FIRES IN MINES.**—At a recent meeting of the Engineers Club, Philadelphia, Dr. H. M. Chance described an attempt to extinguish the Kehley Run Colliery fire at Shenandoah City, by carbonic acid gas and nitrogen. The gas was generated in an open brick furnace with reversed draught, and forced into the mine through four 3-inch pipes by injectors supplied with steam at 60 lb. pressure. Each pipe was exposed to supply 1,500 cubic ft. per minute, or a total of 6,000 cubic ft. per minute. The attempt was entirely unsuccessful, and Dr. Chance attributes its failure principally to the impossibility of making the mine airtight, but also considers that the gas was delivered at too high a temperature, and that it was possibly mixed with carbonic oxide.

## Brake for Hoisting Engines.

Engene O'Neill, the accomplished chief draftsman of the Union Iron Works, in this city, is not only an expert at putting into proper shape the ideas and plans of others, but is an inventor or originator himself. He has perfected several different inventions, the best known of which probably is his cut-off motion and valve gear, which has been applied to so many of the big engines on the Comstock. His attention having been turned largely to mining machinery, it is natural that he should be bent upon improvements in that direction. He has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improved hoisting machine brake, which is more particularly applicable to heavy mining machinery.

This invention consists in a novel means for suspending the brake blocks and shoes upon opposite sides of the wheel or pulley upon which they act, so that while swinging about their center of suspension, they act in radial lines toward the center of the wheel. It further consists in an adjustment by which the movement of the two opposing brakes, operated from opposite sides of the wheel by a single mechanism, may be regulated in their movements to and from the wheel.

The brake shoes are secured within the brake blocks in the usual way. These brake blocks have boxes at the rear, midway between the ends, through which pins pass horizontally and have their ends supported in the upper ends of links, so that the brake blocks may turn upon the pins and adjust themselves and the shoes to the face of the wheel when pressure is brought upon them. The lower ends of the links are supported on fulcrums, about which they move when the brakes are moved to or from the wheel. The brakes are supported so that their centers are below the center of the wheel, and the links incline outward from the wheel, so that when released, the brakes will fall away from the wheel by gravitation. The brakes are operated simultaneously by a T-headed lever, this lever being connected with an operating lever by a link, or actuated in any suitable way.

One of the arms of the T-head is connected with the center pin at the rear of the brake block upon the inner side with the lever, and the other is connected with the pin of the opposite brake block by connecting or side rods.

When the long arm of the lever is moved upward, one of the transverse arms will force its brake block against the wheel from that side, and the other one will, through its side rods, draw the opposite block against the wheel from the other side. The blocks move about the pivots of their supporting links in radial lines towards the center of the wheel, and by reason of being joined upon the pins at their center they will press evenly against the rim of the wheel. The weight of the brake block and the inclined position of their supporting links, will cause the blocks to fall away from the wheel, as soon as the pressure upon the lever is relieved.

To regulate their movement and make them fall back evenly and to an equal distance, Mr. O'Neill employs adjusting screws, which pass through nuts supported upon the stationary floor above the center of support of the brake blocks, and other screws which pass through a cross bar which extends between the links. Suitable plates or boppers upon the backs of the brake blocks strike against these screws, and the movement of the brakes is thus limited and the upper and lower portion move back equally.

**HYDRAULIC WELL-SINKING DEVICE.**—The assertion that "there is nothing new under the sun," is often discussed, but there is one thing sure at all events: Solomon never sank for artesian wells in the manner it is done now. One of the most novel and complete inventions to which attention has been turned of late is what might be termed a "hydraulic well-sinking machine," invented by George Vincent, Esq., of Stockton, and designed by Mr. C. V. B. Downing, M. E., of this city (patented through the MINING AND SCIENTIFIC PRESS Patent Agency). This device has been tried at Stockton lately, and we are told, with assured success. It is simply a hydraulic jack on stilts, for forcing one length of pipe after another into the ground until flowing water has been struck. For a new combination of old ideas to accomplish the purpose designed, and for a first trial, it has satisfied the originators perfectly. We are told it will send a 9-ft. length of pipe into the ground in half a minute, and that it readily crushed through a stratum of hard pan 8 inches thick. They hope to revolutionize the well business, and to supersede the old process of boring. We hope to be able to present our readers with a full description of the machine and its workings, accompanied by a cut, in some future issue.

We notice by an exchange, published in an adjoining county to this, that "croppings of petroleum are found to be so numerous and copious on the eastern side of the Summit from Drhams to Santa Cruz line, that, as this latter commodity is believed to flow only from coal beds, little doubt exists that prospecting for coal will ere long receive an impetus."

## The World's Fair.

The New York people who are throwing stumbling blocks in the way of the proposed World's fair, ought to remember that no exhibitions of the kind ever fail to be profitable. This is true either with international exhibitions or local fairs. All such enterprises pay very well. And they not only pay the projectors, but they pay the town in which they are held.

A little foolish matter about exact location ought not to break up the whole matter. Nor should any petty jealousy serve to block the wheels. Every one believes New York is the place to hold the exhibition, and the New Yorkers ought to be complimented at the selection. At all events, they ought to help the affair along in its inception, when it needs help. After it is once started it will work out its own salvation, and will very materially assist the city in which it is located.

California did not make much of a show at the Centennial exhibition, and some of the other States also failed to see the importance of that event till it was all over. They now see the mistake they made in not being well represented. They are anxious to come to the front at the next World's fair. Thousands of people who stayed at home before will go this time, knowing what an educator and instructor such an exhibition is.

We only hear on these the echoes of the grumbles and dissensions about the site, etc., which are taking place. But we do not want to hear even that. We want to hear that a peaceful solution of all the differences has been found, and that New York will graciously accede to the demands of the nation and not hold back like a spoiled child any longer. New Yorkers, though prosperous, can afford to be more so; and, being well to do, ought to desire to see what other places are doing. With an exhibition of the products of the United States gathered at one spot, now, the Centennial would be excelled. All the Pacific coast States and Territories would join with a will this time and would show the older communities what advancement they are making. Let us have this World's fair by all means.

## The Mining Bureau Appropriation.

We have already mentioned the fact that the Senate refused to concur with the Assembly in appropriating \$12,000 for two years to the State Mining Bureau. The bill was amended by the Senate striking out the appropriation altogether, thus leaving the Bureau with the small income only it derives from the taxes on mining stocks. Last week in the Assembly, consideration of the Senate amendment striking out the \$12,000 appropriation came up. McClure took the floor and vigorously and vehemently opposed the appropriation, to the surprise of all who had heard him at the regular session earnestly favor the giving of \$10,000 per annum to the Bureau, and also to have 1,000 extra copies of the State Mineralogist's report printed.

Wasson, of Mono, again took the floor and said with an animation which hushed the House into silence and attracted the attention of all: Will the gentleman from San Francisco (McClure) please explain to the House his consistency in now opposing the appropriation of \$6,000 per annum to the support of the Mining Bureau, when he at the regular session of this Legislature favored the giving to that same Bureau the sum of \$10,000 per annum. The support of this appropriation for the Bureau, said he, is recommended by the Governor in his annual message, and the Executive, in calling the extra session, implied, so far as words could possibly do, that this was a State institution, as much as is the State University, the insane asylums, etc. Then he vigorously urged a call of the roll, and amid much applause sat down. The House refused to concur in the amendment of the Senate to strike out the appropriation, by a vote of 47 yeas to 13 nays.

As the matter now remains, as we understand it, the question will be left to the Committee of Conference. It is probable that whatever is agreed upon by this committee will be carried out by both Houses of the Legislature. Mr. Wasson has made a good fight on this question, for which he deserves the thanks of the mining community. He has also been a strong advocate of continuing the State Engineer in office, at least until all the maps, etc., are finished.

**RICHMANN DRILLS.**—The Richmann Drill and Air Compressor Co., in this city, are making quite a number of their machines. One of the compressors is a very large one, with 16-inch bore and 20-inch stroke. They are also making a duplex—one with two cylinders—which is to be run by water power, on a California mine. The drill and compressor at the Barbee & Walker mine, Silver Reef, Utah, is working first-rate. There is one compressor and two drills at the Yuba mine, Nevada county; one at the Central Arizona mine, Arizona; one at the Florida mine, Calaveras county; and one at Silver Hill mine, on the Comstock. All of these are said to be giving good satisfaction. A compressor and two drills were shipped this week to a mine near Oroville, Butte county.



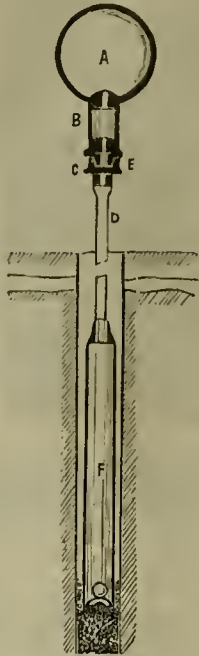
Mount Shasta.

The engraving on this page shows Mt. Shasta from a point of view different from that held by most who look upon it.

The noblest mountain in the United States is Shasta. It is said that Whitney is higher, but Whitney has for its base the Sierra Nevada, and the peaks around it dwarf its own tremendous height. But Shasta rises from the plain a single mountain, and while all the year around the lambs gambol at its base, its crown is the eternal snow. In the hot summer days, as the farmers at Shasta's base gather their crops, they can see where the wild wind heaps the snow drifts about his crest. The mountain is one of winter's stations, and from his forts of snow upon its top he never withdraws his garrison. There are the bastions of ice, the frosty towers; there his old hugler, the wind, is daily sounding the advance and the retreat of the storm. The mountain holds all latitudes and all seasons at the same time in its grasp. Flowers bloom at its base, further up the forest trees wave their ample arms; further still the brown of autumn is upon the mountain slopes, and over all hangs the eternal winter. Standing close to the mountain's base, the human eye and mind fails to grasp the immensity of the mountain. But as one from a distance looks back upon it, he discovers how magnificent is the sight. For days will the mountain fold the mist about its crest like a veil, and remain hidden from mortal sight, and then suddenly, as if in deference to a rising or setting sun, will roll back the vapors, and the watcher in the valley below will behold gems of topaz and of ruby made of sunbeams set in the diadem of white, and toward the sentinel mountain from a hundred miles around men will turn their eyes in admiration. Thus it frowns and smiles alternately through the years; it heils the incoming and outgoing centuries, changeless amid the mutations of ages; forever anster, forever cold and pure. Of all American mountains it has the most sovereign look; it leans on no other height; it associates

Cleaning Drill Holes.

J. L. Prentiss, of Canyon City, Colorado, has devised a means by which drillings may be easily and quickly removed from drill holes,



Pneumatic Drill-Hole Cleaner.

and which is simple in construction and convenient in use. A good many miners will find this a useful device, especially in certain kinds

In the lower end of the tube *F* is placed a ball valve, as shown in the drawing. The tube *F* is made of less diameter than the hole to be cleaned, and its lower edge is notched to allow the drillings to enter the tube readily.

In using the instrument the metal tube *F* is lowered into the drill hole until its lower end rests upon and is embedded in the drillings. The bulb *A* is then compressed, forcing the air out through the hole in the connection piece *B*. The hole is then closed with a finger, and the bulb *A* is released and allowed to expand, and the atmospheric pressure will force the drilling into the lower end of the tube *F*, to take the place of the air which passes up into the bulb *A* when the pressure upon the bulb is removed. By compressing the bulb *A* two or three times, all the drillings will be forced from the drill hole into the tube *F*, and the device may then be removed from the drill hole. The ball valve at the lower end of the tube is forced up with a finger and the drillings allowed to flow out. If desired the rubber bulb may be replaced by a bellows suitably formed to produce a vacuum.

High Explosives.

(Written expressly for the MINING AND SCIENTIFIC PRESS, by M. EISELES.)  
Number Five.

Dynamite or Giant Powder.

No better illustration can be given of this material than by repeating Alfred Nobel's, the inventor's, own descriptive words, which are as follows:

"My invention relates to a new and useful combination or mixture of nitro-glycerine with some absorbent substance, whereby the condition of the nitro-glycerine is so modified as to render the resulting explosive compound more practically useful and effective as an explosive, and far more safe and convenient for handling, storage and transportation than nitro-glycerine in its ordinary condition as a liquid. The invention consists in combining or mixing

or absorbent substance with which it is mixed, and then assuming the altered form of a powder or paste remains in the bore hole in which it is placed, without leaking through the seams of the rock. Another advantage over liquid nitro-glycerine is, that this mixture can be made to fill the bore hole more closely than a cartridge case will, owing to the irregularities of the shape of the hole, which greatly increases its efficiency. The liability of fluid nitro-glycerine to accidental explosion from agitation or concussion renders its handling and transportation very dangerous. This danger is, however, almost entirely obviated by the use of the compound, because, when mixed with a suitable absorbent the nitro-glycerine is far less sensitive to shocks than when in a liquid condition, so it may be handled in mass either loose or in packages with impunity. This invention then, consists in mixing liquid nitro-glycerine with some solid substance, which will absorb and retain a sufficient amount of nitro-glycerine to form an efficient explosive. The substance which is believed to be the best adapted for this purpose is a kind of silicious earth found in various parts of the globe, and known by the various names of silicious marl, tripoli, rotten stone, kieselguhr. The peculiar variety of this material best suited for this use is homogeneous, has a low specific gravity and great absorbent capacity, and is generally composed of the remains of infusoria. So great is the absorbent capacity of this infusorial earth, that, when in a pulverized condition, it will take up three times its own weight of liquid nitro-glycerine, and still retain the form of a powder. Other porous substances, even though they have less absorbent capacity may be used, but in this case the explosive strength of the powder will be diminished, owing to the smaller proportion of nitro-glycerine contained therein. Chalk, for example, will absorb about 15% of nitro-glycerine and retain its powdered condition; and porous charcoal, although of greater absorbent capacity, has less elasticity of particles, so that nitro-glycerine is apt to squeeze out of it. Any of the various vegetable or mineral substances susceptible of pulverization or comminution, and which will retain nitro-glycerine by absorption, may be substituted for infusorial earth. The



MT. SHASTA—SUMMIT 14,440 FEET ABOVE THE SEA, AS SEEN FROM THE OREGON AND CALIFORNIA STAGE ROAD.

with no other mountain; it builds its own pedestal in the valley and never doffs its icy crown. The savage, in the long ago, with awe and trembling, strained his eyes to the height, and his clouded imagination pictured it as the throne of a deity, whence issued the snow, the frost and the wild wind from their hewing place on the mountain's top. The white man with equal awe strains his eyes upward to where the sunlight paints with purple and gold the mimic glaciers of the height, and is not much wiser than was the untutored savage in trying to comprehend how and why the mighty mess was upheaved. It is a glory in itself. It seizes the clouds with icy arms and compresses them until their contents are dropped upon the thirsty fields below; from its base the Sacramento starts on its way to the ocean; despite its frowns, it is a merciful agent to mankind, and on the minds of those who see it in all its power and splendor, a picture is painted which will last as long as the gift to admire anything magnificent is left.

of ground, where the drillings are hard to remove.

In the engraving *A* represents a rubber bulb four inches (more or less) in diameter, and with which is connected a short tube or connection piece *B*, provided with a hole in its side for the escape of the air when the bulb *A* is compressed.

In the outer end of the connection piece *B*, or in the coupling *C* that connects the said connection piece *B* with the rubber hose *D*, is placed a valve, *E*, opening upward. The valve *E* prevents the air from being forced into and compressed in the rubber hose *D* and the tube *F* coupled to it, when the bulb *A* is compressed.

The end of the metal tube *F* may be reduced in diameter to receive the rubber hose *D*, or the hose can be connected to said tube by a coupling, in order that the hose may be readily detached and replaced with a longer one or a shorter one, as the depth of the drill hole to be cleaned may require.

with nitro-glycerine some porous or absorbent substance, which, being free from any quality which will cause it to decompose, destroy or injure the nitro-glycerine, forms, in combination with it, an explosive compound possessing certain marked properties of great practical utility, which not only increases its efficiency, but also obviates many of the serious practical objections to the employment of nitro-glycerine as an explosive. Some of these peculiar properties of this mixture will be briefly stated: Nitro-glycerine being a liquid, it is usually necessary in exploding it as an explosive for blasting purposes, to place it in cases or cartridges formed of paper, metal, or other substance, which must, of course, be of somewhat smaller diameter than the bore holes, as, if not so enclosed, the nitro-glycerine would permeate the seams of the rock, and prove highly dangerous to the miner, on account of its liability to explode in subsequent drillings; but by means of my invention, the nitro-glycerine, being held in combination with the porous

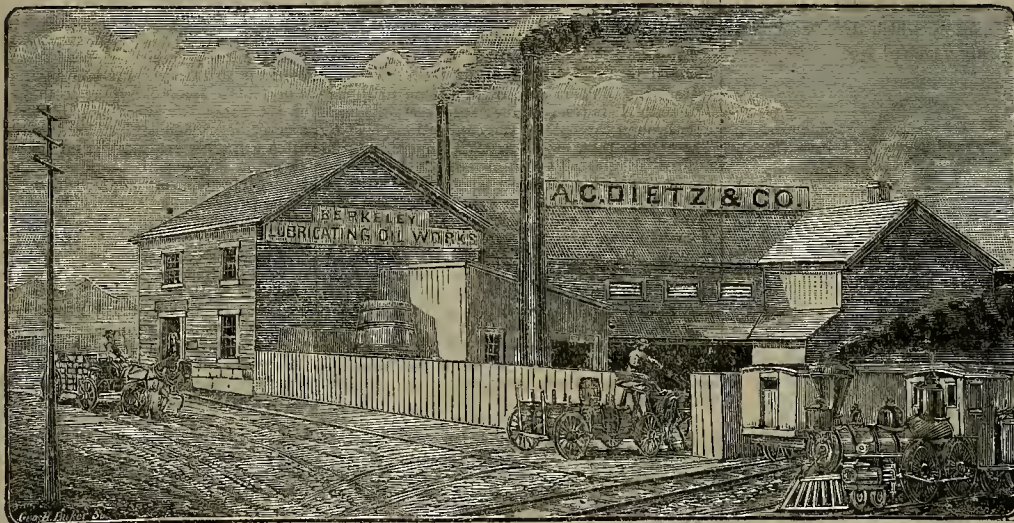
relative proportion of the ingredients used in making this non-explosive compound will vary according to the absorbent capacity of the substance mixed with the nitro-glycerine, it being preferable in all cases—and this is the only limit—to use so much only of the liquid nitro-glycerine as the absorbent substances will retain without liability to subsequent separation by compression or leakage. Where the absorbent used in a powdered condition is infusorial earth, a thin paste or semi-fluid condition of the mixture is to be avoided.

"The method of manufacturing this explosive compound with infusorial earth is as follows:

"The earth being thoroughly dried and pulverized, is placed in any suitable vessel, and the nitro-glycerine is then gradually introduced, and thoroughly mixed with the powdered earth, which is effected either by stirring with the naked hand or by means of any suitable wooden instrument, worked either by machinery or by



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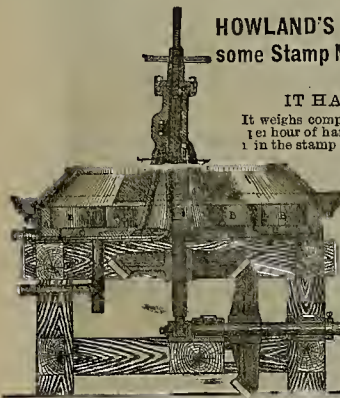
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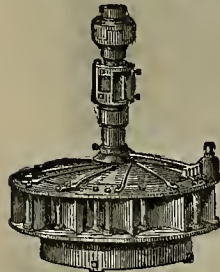
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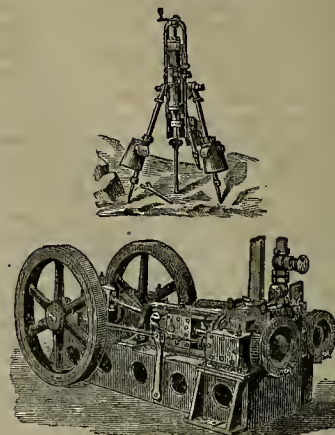
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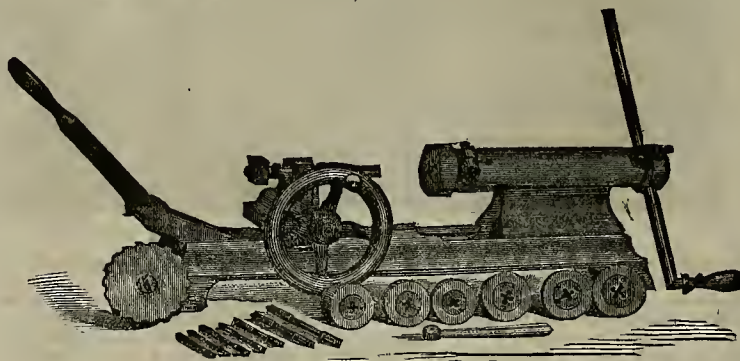
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United States; Superintendent of the United States  
Special Commissioners of Mines; Member of the  
Committee on Mines at the Congress of Na-  
tions held in St. Petersburg, Russia;  
Mining Commissioner for the United  
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Will furnish estimates, plans and specifications, and super-  
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procured both information and supplies.Patented and Street Lamps to Burn Coal  
Oil, Naphtha and Gas.**BOESCH'S PATENT**Hydraulic Mining and Locomotive Head Lights, with the  
Latest Improvements, making them the best and  
cheapest in the market.**Pacific Lamp and Reflector Factory.**

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Breaker and Cornish Rolls Combined in one Ma-  
chine. Pulverizers to granulate Ores for Roast-  
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for DIAMOND POINTED DRILLS, now brought to the  
highest state of perfection, are prepared to fill orders  
for the IMPROVED PROSPECTING AND TUNNELING  
DRILLS, with or without power, at short notice, and  
at reduced prices. Abundant testimony furnished of  
the great economy and successful working of numerous  
machines in operation in the quartz and gravel mines  
on this coast. Circulars forwarded, and full infor-  
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Pacific Power Co.'s new brick building,  
Stevenson street, near Market. Eleva-  
tor in building. Apply at the Com-  
pany's office, 314 California street.



## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING APRIL 19, 1881.

240,354.—WHIP—J. W. Allen, Canyon City, Or.  
240,303.—PRESS—L. A. Comins, San Jose, Cal.  
2,879.—HANGING DOORS—C. N. Earl, Los Angeles, Cal.  
(re-issue)

240,242.—BELLOWS—J. Fletcher, S. F.  
240,261.—DRSTROYING PHYLLOXERA—E. H. Lindeman, S. F.  
240,329.—HOISTING MACHINE BRAKE—E. O'Neill, S. F.  
240,330.—LIGHTING JACK—A. H. Parks, Bloomfield, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DREW & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through DREW & CO.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**BALING PRESS.**—Lucy A. Corning, San Jose, Santa Clara county, California. Patented April 19, 1881. No. 240,303. This invention relates to certain improvements in that class of machines known as horizontal baling presses, and it consists of a horizontal box having four chambers and two feed spaces so arranged that each feed space can be employed to feed two chambers, while two followers or baling heads are united by bars which are attached upon each side of the press by cranks upon the end of a shaft, so that they are moved back and forward in the press box simultaneously, each pressing two hales as they are wound alternately backward and forward. These followers, in their forward motion, press the end of two hales, and in their backward journey, two others. It consists, further, of a belt or clasp, acting with a lever, by which the doors of the press chambers are fastened; and on peculiar crank-wheels which serve to actuate the followers on a frame, and also as stops at the end of the measurement in each direction. The object of this invention is to make one machine do the work of four single ones, with the same motions, and to provide a machine which can be easily operated, and of such simple construction that an ordinary blacksmith and carpenter can build it.

**DITCHING PLOWS.**—Alfonso Haskies, Davieville, Yolo Co., Cal. Patented April 12, 1881. No. 240,127. This ditching plow has a coulter, wheel, made adjustable, and a shoe secured to the standard. The shoe is of considerable length, narrow, and flat upon its bottom, so as to run on the bottom of the trench and smooth and level it like a plane. The point is formed or received on a bar or plate which has its upper end secured to the standard, and extends down to the front of the shoes, thus forming a support to the shares, which may be held to it. The shares conform to the outline of this bar, and are made narrower and flat at their lower front end, so as to receive the earth from the point. This flat surface extends upward and backward, widening slightly up to the point where the shares begin to curve outward. The surface of this portion is nearly on a straight line from the point, and brings the earth up to the flaring portion of the shares, which then take it and throw it outward upon each side and entirely clear of the trench. By this means trenches may be formed of any desired depth, and having a perfectly smooth, flat bottom, suitable for laying cement or other pipe. The plow is specially adapted to the formation of ditches in which irrigating pipe is laid, and which is formed and laid at one operation from the plastic material.

**FLUSHING SEWERS.**—Peter Burke, Virginia, Nev. Dated April 26, 1881. No. 240,655. This invention relates to a novel means of flushing and cleaning sewers and it consists in the employment of a series of water pipes which are suitably supported or hung from the apex of the sewer, and are provided with a series of nozzles standing at such an incline that they will discharge a jet of water into the deposit at the bottom of the sewer irregularly, and in the direction of the flow, so as to loosen up the deposit and cause it to move on through the sewer. These nozzles and supplemental pipe are connected in sections with a main water pipe exterior to the sewer, and have cocks near the curb, so that water may be turned into any one or more sections at one time, and thus flush that part of the sewer. As a considerable portion of the gas generated in sewers is soluble in water, this invention will have the effect of taking up some of this gas and reducing the pressure on the sewer, thus preventing in a great measure the evil effects caused by this pressure, and the escape of gas into buildings which are connected with the sewer.

A PROMINENT diplomatist at St. Petersburg reports that the Czar and his counsellors are disposed to adopt the rigorous oppressive measure, having no example in Russian history.

### High Explosives, etc.

(CONTINUED FROM PAGE 297.)

hand. Where infusorial earth is used, the proportions may be conveniently varied, from 60 parts by weight of liquid nitro-glycerine and 40 parts by weight of infusorial earth; or 78 parts by weight of nitro-glycerine and 22 parts by weight of infusorial earth; the former proportions forming, at ordinary temperatures, a dry, pulverulent mass, and the latter a pasty mixture. Let it be here observed, that the explosive force of the mixture is increased when a larger proportion of nitro-glycerine is employed, and that, when the mixture is to be used in a cold climate, a larger quantity of nitro-glycerine may be safely employed than when it is to be exposed to a warmer atmosphere.

"For ordinary practical purposes a mixture of 75 parts by weight, of nitro-glycerine, and 25 parts, by weight of infusorial earth, gives a powder sufficiently dry at ordinary temperatures, and which is susceptible to compression to a specific gravity nearly equal to that of pure nitro-glycerine. When the ingredients have been intimately mixed, and thoroughly incorporated by stirring and kneading, the powder is then ready for use, and may be packed in bulk in boxes, or compressed into cartridge cases made of paper, of such convenient sizes as may be most in demand for blasting purposes.

"In using this improved explosive compound for blasting, it may be inserted into cartridge cases, as above stated, or without any inclosure or wrapping as may be preferred. For the best effect it should be pressed firmly down so as to fill the bottom of the bore hole, always using a wooden rod for the charging of the hole. (Every miner is aware of the importance of having his charge of powder firmly set in the bottom of the hole). It is easily and efficiently exploded by means of an ordinary fuse inserted into the open end of a percussion cap, the metallic edges of the cap being compressed or crimped tightly and firmly around the fuse, in close contact with the fulminate in the percussion cap. The capped end of the fuse is then inserted into the explosive powder, which is pressed closely around it in the bore hole, and a tamping of sand or other suitable material may be placed above the charge of powder and pressed down upon it. The fuse thus applied is fired in the ordinary manner; and when the fire reaches the percussion cap, it explodes, which effects the immediate explosion of the charge of explosive compound."

Nobel's invention consists, therefore: "In the combination of nitro-glycerine with infusorial earth or other equivalent absorbent substances." Kieselguhr or guhr is found in Hanover, Germany. It is a soluble variety of silicious earth, is a white, mealy substance, composed of the silicious armor of a species of shells (*Diatomeen*) that form a multitude of small cells which possess considerable hardness and, looked at through a microscope, show their perfect state of preservation. This guhr possesses, as has been shown above, an immense absorbing capacity, and owing to the peculiar form of these infinitesimal small shells, every small particle of nitro-glycerine is, so to say, surrounded by it, and lies (is stored away) in a small cavity of this porous material in such a manner that these particles of guhr prevent the propagation of the vibration caused by a comparatively strong concussion. It can be said that each particle of nitro-glycerine is packed away separately in each particle of guhr in which it is retained by capillary attraction, and consequently the great objection against the liquid is in this way obviated.

At first the new blasting agent made but slow progress, owing in a great measure to the strong prejudice existing against its chief ingredient. But gradually it has grown into favor and numerous dynamite factories have sprung up all over Europe and America, and not less than a dozen were under the inventor's control, and what is more are on a paying basis.

It was not long after its introduction to the practical and scientific world, that it was universally adopted in both hemispheres, as it became an absolute necessity to the engineer and miner. During the last two decades, which are so eminently marked for the great advancement in railroad building, this material has been an immense aid in cutting the path for the great reformer of our modern age—the iron horse. And certainly the greatest credit is due to the inventor who has furnished us the means of accomplishing results, which might have been delayed for years had it not been for the excellent material which he has put into our hands.

The great success of dynamite has given rise to numerous other nitro-glycerine compounds, of which the most known are the Lithofacteur, Dualine, Hercules, Vulcan, Warren, Excelsior powders, which have entered into successful competition with Nobel's dynamite. The remark will be made here, that the object of these articles is not to say which is the best nitro-glycerine compound, but to impart to the reader the knowledge of what they are, as the miners on this coast are too intelligent a class of men to be told which is and which is not the best of these powders. Let everyone use his own judgment on that subject. It is self-evident that that compound which holds absorbed the greatest amount of nitro-glycerine in a pure and neutralized condition, will make the strongest, and consequently, the best powder. In some cases, where the absorbents used do not possess the great absorbing capacity of kieselguhr, the admixture of meal powder is resorted to, to add to the strength of the compound, be-

sides acting also as a vehicle to carry the nitro-glycerine.

The strength of dynamite, No. 1, is set down for equal weights to be as one to five, as compared with black powder, although in practice, some authorities set it lower, and some higher.

Dynamite forms a fine grain, somewhat pasty and fatty substance of gray brown color, which has, under the ordinary pressure employed to form it into cartridges, a specific gravity equal to liquid nitro-glycerine.

Against fluids and solutions it compares itself in the same manner as nitro-glycerine, only it must not be permeated by water, because it separates the oil from the guhr. Against heat it bears the same relation as nitro-glycerine. Dynamite burns in an open flame or on live coal with a quiet development of gases, but it must not be confined, and only when wrapped up in paper or other light substances, like wood; but in that case even there is danger of its being heated to the exploding temperature. Especially in storing large quantities, like in magazines, it can happen that during a fire an explosion can take place, as the mass may become heated to 380° before the same is burnt up. Such an accident happened in the dynamite factory at Hamburg on the 12th of July, 1866.

Against moderate strokes and concussion, such as may happen during transport, like the running together of the heavy box cars on railroad trains, jolting of freight wagons, dropping of case, the material is insensible, and although an instance is on record where during a collision a box car containing dynamite was all broken up, the boxes smashed and the powder split without explosion, it must be recommended to always handle this material with due precaution.

Some experiments as to its safety in regard to percussion are of interest:

A strong wooden keg containing 10 lbs. of dynamite put up in cartridges, was thrown from a height of 100 ft. against a rock, and the keg and contents remained intact.

To a flat stone weighing 200 lbs., a cartridge of dynamite was tied and then the stone dropped from a height of 20 ft. The cartridge was all smashed to pieces, but it did not explode. In spite of these reassuring results, which show the insensibility of the material against heavy percussion, we have on record some very distressing accidents, which have for causes the reckless handling of the same; and therefore let it be again repeated that although dynamite is a very safe substance when handled with ordinary care, it must not be forgotten that it is the highest explosive known, and that it ought to be treated accordingly.

In its frozen condition it is hard to explode, but even then it is to be recommended not to employ any pointed instruments for breaking it up, and in thawing it out to follow the ordinary rules which are known to every miner. It is very hard to explode frozen dynamite, consequently accidental explosions with the frozen stuff ought certainly be easily avoided.

It is hardly to be presumed that we will reach such a point in the manufacture or handling of explosive substances, as to dynamite, he it gun cotton, or be it gun powder, where claim can be laid to an absolute safety, as some accidental combination of circumstances will lead to explosions, and it is therefore the question, that under ordinary circumstances these accidental combinations should be avoided, which can be done by the exercise of care, prudence and precaution, and also by a perfect knowledge of the properties of the material, by the parties who handle it.

Dynamite has been in use in this country some 13 years; it has been shipped and transported over thousands of miles, been distributed in thousands of parcels in different parts of our Territories, under different atmospheric and climatic conditions, and, so far, spontaneous explosions of magazines are not on record as yet. Numerous distressing accidents have occurred, but from different causes, and consequently we presume the theory of scientific men, that dynamite does not explode spontaneously, to be correct, as the particles of nitro-glycerine are finely distributed through the kieselguhr, and if, during a storage of long duration, the nitro-glycerine decomposes the decomposition takes place slowly and gradually and does not lead to disasters.

I adopt the theory of scientific men that dynamite does not explode spontaneously, not because scientific men say so, but because practice has proven it up to this date, and it is to be hoped that future experience will bear out this theory.

As yet, I cannot consider the different dynamites as the perfect ideals of modern blasting agents, as they possess some disadvantages, which, no doubt, science will overcome in time.

1. The easy separation of the nitro-glycerine from the absorbents through water, which necessitates that it has to be put in water-tight cartridges when used under water for any length of time.

2. It gets hard at a comparatively high temperature; it freezes.

3. A more complete neutralization of its fumes, so as to make them less obnoxious.

THE iron giants of the Pennsylvania railroad company will be built this summer at Altoona. They will be much larger and more powerful than the ordinary passenger engines, and are to be built for the particular purpose of making up time in portions of the road where there are long stops.

### Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORN—San Francisco.  
A. C. KNOX—Sonoma, Napa, Lake and Mendocino counties.  
G. W. MCGREW—Santa Clara county.  
M. P. OWEN—Santa Cruz county.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
N. E. BORN—San Bernardino Co.  
JARED C. HOAG—California.  
B. W. CROWELL—Tehama and Butte counties.  
D. W. KRELLER—Santa Barbara, Ventura and San Luis Obispo counties.  
A. LEONARD MEYER—Utah, Idaho and Montana Ter.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals are of good vigor. A day at Woodward's Gardens is a day well spent.

A gentleman just arrived from Colorado who is thoroughly posted in the treatment of refractory ores, and who has been a director for 3 years in the Austrian Government Reduction Works in Europe, would like to engage his services to a Mining and Reduction Company, either as Superintendent or Assistant, or to take charge of the Assay Department. Address H. S., this office.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond this time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

THE State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M. to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

### Metals.

[WHOLESALE.]  
WEDNESDAY, May 4, 1881.

IRON.—		
American, Pig, soft, ton.....	32 00	@ 33 00
Scotch, Pig, ton.....	26 00	@ 27 00
American White Pig, ton.....	—	@ —
Oregon Pig, ton.....	—	@ —
Refined Bar.....	42 00	@ 43 00
Horse Shoes, keg.....	7 00	@ 8 00
Nail Rod.....	—	@ —
Norway, according to thickness.....	84 00	@ 94
STEEL.—		
English Cast, lb.....	16 00	@ 18
Black Diamond, ordinary sizes.....	13 00	@ 15
Drill.....	9 00	@ 10
Flat Bar.....	—	@ 10
Flow Steel.....	9 00	@ 10
COPPER.—		
Ingot.....	—	@ 52
Sheet.....	—	@ 25
Sheathing, Tinned 14x18.....	—	@ 42
Nails.....	—	@ —
Bolts.....	38 00	@ 42
Old.....	—	@ 18
Bar.....	—	@ 22
Precipitate, 100 fine.....	18 00	@ 19
LEAD.—		
Pig.....	42 00	@ 5
Bar.....	—	@ 6
Pipe.....	—	@ 8
Pipe, soft.....	—	@ 9
Shot, discount 10% on 500 Bags.....	—	@ —
Drop, per bag.....	—	@ 2 10
Buck.....	—	@ 2 30
Chilled.....	—	@ 2 50
TIN.—		
10x14 I O Charcoal.....	—	@ 20 50
10x14 I O Coke.....	10 00	@ 20 00
Banca Tin.....	—	@ 25 00
Australian.....	—	@ 20 00
I. C. Charcoal Roasting 14x18.....	—	@ 20 00
" " 20x28.....	20 00	@ 21 00
ZINC.—		
By the Osk.....	—	@ 10
Zinc, Sheet 7x3 ft. 7 to 10 lb. less the cast.....	10 00	@ 11
NAILS.—		
Assorted sizes.....	4 00	@ 4 75

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company.

SAN FRANCISCO, MAY 2, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, Director No. 23, of Seventy-five (75) cents per share, was declared, payable on THURSDAY, May 12, 1881, at the office in this city, or at the Agency of the Nevada Bank of San Francisco in New York.

WILLIAM WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

### NEW MINING FIELDS.

Prof. Hayden's Geological survey of the northern wilds, comprising his explorations in the Big Horn, Gray Bull, Yellowstone and Sun River Countries, Wind River, Teton and Little Rocky and Bear Paw Mountains. Their geology and physical features. Where the survey found "paying prospects," going from 6 to 25 cents in gold to the pan. Immense gravel bars prospecting 8 and 10 cents per pan. Water abundant for hydraulic mining. Extensive gold and silver bearing quartz lodes, one mammoth ledge as yielding \$15.90 in free gold per ton, from surface croppings. The classes of country rock peculiar to each section, which interest the miner, as being the most congenial for the existence of rich veins and placers. A valuable work (with map), forming a complete intelligible, systematic guide and companion for miners and gold hunters, desirable of prospecting in the northern Rockies and localities mentioned. Terms, \$5 per copy; 5 copies for \$20. Address J. A. CAMPBELL & CO., Evanston, Wyo. Ter.  
Box No. 119. [Mention this paper.]



## INGERSOLL ECLIPSE ROCK DRILLS.



The Most Economical Air Compressors in the Market.

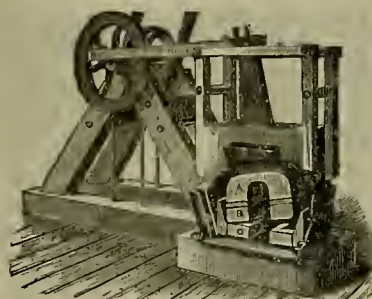


## MINERS' HORSE-POWER.

One Horse can easily hoist over 1,000 pounds at a depth of 600 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

REYNOLDS & RIX,  
49 Fremont St. S. F.

## HUNTINGTON'S Oscillating Stamp Mill



It has no Stems, Cams, or Tappets, and Adjusts Itself to the Wear of the Shoes and Dies.

For Simplicity, Economy, Durability and Effective Working, it exceeds anything ever presented to the public, and will do the work of five stamps with one-fourth the power.

Price, 900-Pound Hammer, . . . \$500.  
Double Mills, . . . \$950.  
Price, 1200-Pound Hammer, . . . \$600.  
Double Mills, . . . \$1150.

Send for Circulars and Testimonials.  
SHINGLE MACHINES and SAW MILL MACHINERY,  
STEAM ENGINES, ETC., TO ORDER. MINING  
MACHINERY OF ALL KINDS.

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220 Fremont Street, San Francisco.

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CONTAINS 113 ROOMS.

715 Howard St., near Third, San Francisco.

This House is especially designed as a comfortable home for gentlemen and ladies visiting the city from the interior. No dark rooms. Gas and running water in each room. The floors are covered with holly Brussels carpet, and all of the furniture is made of solid black walnut. Each bed has a spring mattress, with an additional hair top mattress, making them the most luxurious and healthy beds in the world. Ladies wishing to cook for themselves or families, are allowed the free use of a large public kitchen and dining room, with dishes. Servants wash the dishes and keep up a constant fire from 6 A. M. to 7 P. M. Hot and cold baths, a large parlor and reading room, containing a Grand Piano—all free to guests. Price single rooms per night, 50 cts.; per week, from \$2.50 upward.

R. HUGHES, Proprietor.

At Market Street Ferry, take Omnibus line of street cars to corner Third and Howard.

42 years' practical experience; 14 on Pacific Coast.

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## HERCULES POWDER

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.

It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

No. 1 XX is the Strongest Explosive Known.

No. 2 is superior to any powder of that grade.

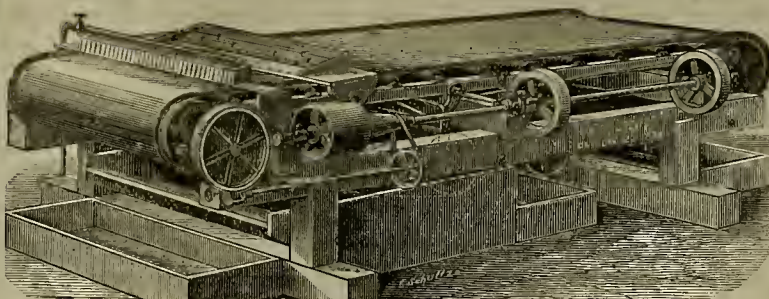
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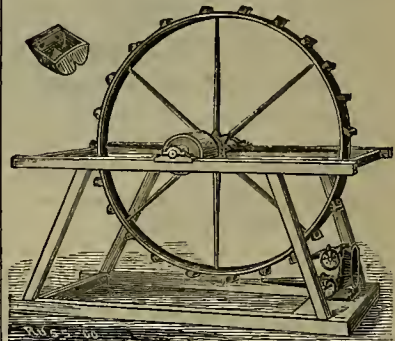
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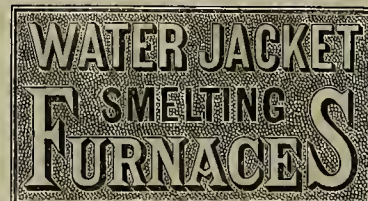
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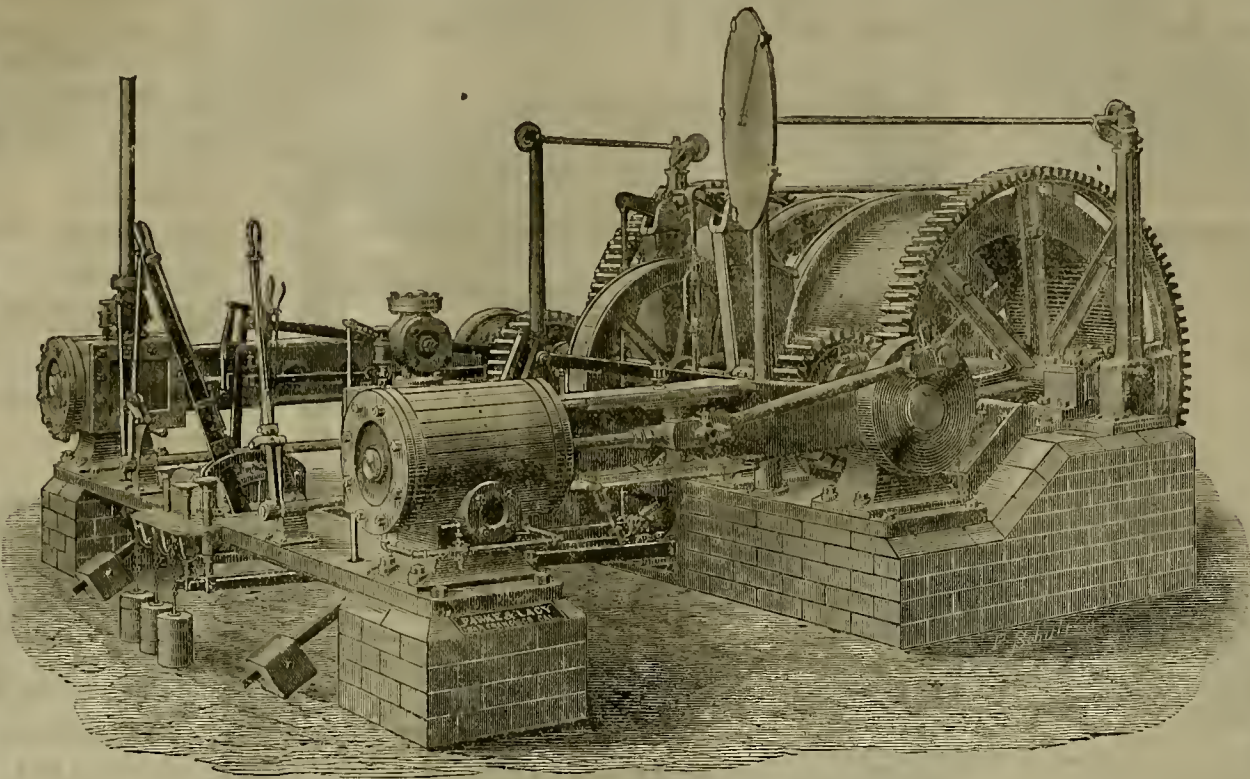


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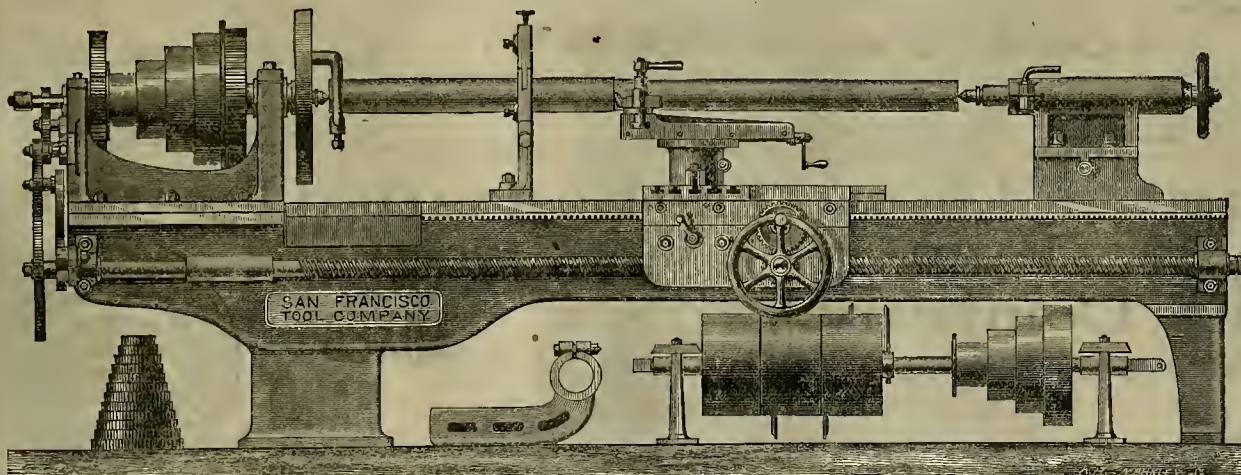


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The Challenge Ore Feeders are now in use in the following Mills, besides many others:

Soulsby.....	20	Stamp.....	20	Stamp.....	20
Sheep-Ranch.....	20	.....	20	.....	20
Mahoney.....	40	.....	40	.....	40
Zelle.....	40	.....	40	.....	40
Placerville.....	40	.....	40	.....	40
Gross.....	80	.....	80	.....	80
Julian.....	20	.....	20	.....	20
St. Patrick.....	15	.....	15	.....	15
Providence.....	20	.....	20	.....	20
Omaha.....	10	.....	10	.....	10
Green Mountain.....	60	.....	60	.....	60
Phumas-Eureka.....	60	.....	60	.....	60
Lower-Standard.....	30	.....	30	.....	30
Standard.....	20	.....	20	.....	20
Noonday.....	30	.....	30	.....	30
Bodie.....	10	.....	10	.....	10
Christy.....	5	.....	5	.....	5
Ontario.....	40	.....	40	.....	40
Contention.....	20	.....	20	.....	20
Grand Central.....	20	.....	20	.....	20
Harshaw.....	20	.....	20	.....	20
Sanshine.....	20	.....	20	.....	20
Homestead.....	20	.....	20	.....	20
Father De Smet.....	80	.....	80	.....	80
Hidden Treasures.....	40	.....	40	.....	40

Superiority of the "Challenge" Ore Feeder Demonstrated!

At the "Christy" Mill, Uintah County, Utah, the "Eclipse" Feeders, (conceived by E. Coleman) were introduced, but not carrying a regular supply of ore for the crushing capacity of the stamps, were replaced by the "Challenge," which are now running and the stamps crushing forty (40) per cent. more ore than was done by the "Eclipse."

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Four of the "Victor" Feeders, manufactured by E. T. Steen, were also placed in the "Alexander" Mill, at Grantsville, Nevada, but after a fair trial were discarded, and Hendy's Feeders fitted, and four others of the same pattern added when the second twenty stamps were erected.

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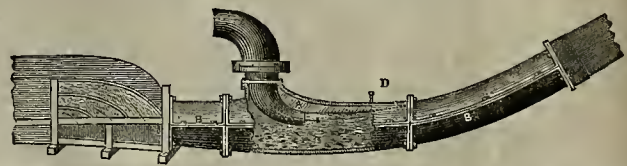
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
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## Emery Wheels.

The growth of mechanical invention is a wonder of this wonderful age. In every sphere of industry the application of labor-saving tools is the dominant ambition, and the wise artisan carefully calculates the possibility of employing machinery in the production of his goods so as to reduce to a minimum the actual cost in time and labor. The tools of a quarter of a century ago are even now so far eclipsed, in many departments, that with their use it would be impossible to keep abreast of requirement. This is especially true of sharpening, shaping and grinding tools. What a ridiculous absurdity the file is, compared with a Tanite emery wheel! How pitiful it is to reflect that men were compelled to devote days and weeks of exhaustive labor with a clumsy rasp, to what may now, by easy manipulation, be more neatly and satisfactorily accomplished with an emery wheel in a few minutes.

The emery wheel is a king among inventions. It is emphatically "the Jack of all trades," and "master" of them as well. With the aid of a diamond tool the Tanite emery wheel can be turned in a very few moments to fit any desired shape—convex, concave, beveled, etc., etc.—cutting the exact reverse of its own, so as to meet any possible requirement. The failure to add this universally applicable tool to a well-stocked mining plant is more than unfortunate.

In mines remote from manufacturing centers, it will save inconceivably in time and annoyance. Suppose some part of the machinery breaks, as the best-made machinery will do—the hoisting gear give out, the pumping apparatus get out of order, the rock drills need repairs, or what not—having one of these wheels at hand, it is not necessary to send the broken shaft, or wheel, or valve, or pulley, or whatever, to a distant machine shop, and have the works shut down for several weeks, till duplicate pieces can be furnished or the broken ones repaired;—it is a machine shop in itself. With a diamond tool, the cost of which is a bagatelle, it is quickly put into shape, and any desired result is speedily effected on the spot without the annoyance of any perceptible delay; a saving of time and money miners will appreciate.

In the development of Mexican mines, where hitherto only the crudest appliances have been employed, the very best machinery is now being used. This is notably so of the Rosario mines, operated by an organization of New York capitalists, of which the Governor of New Jersey is President. But as these mines are so far inland, the neglect to furnish the costly and magnificent plant, provided by the enterprising company, with a full outfit of these wheels and grinding machinery, would seem to be almost unpardonable. Even in close proximity to machine shops these wizard wheels are an absolute necessity, and save incalculably in time and labor to the intelligent operator; but in cases like that just suggested, it is foolhardy to be without them.

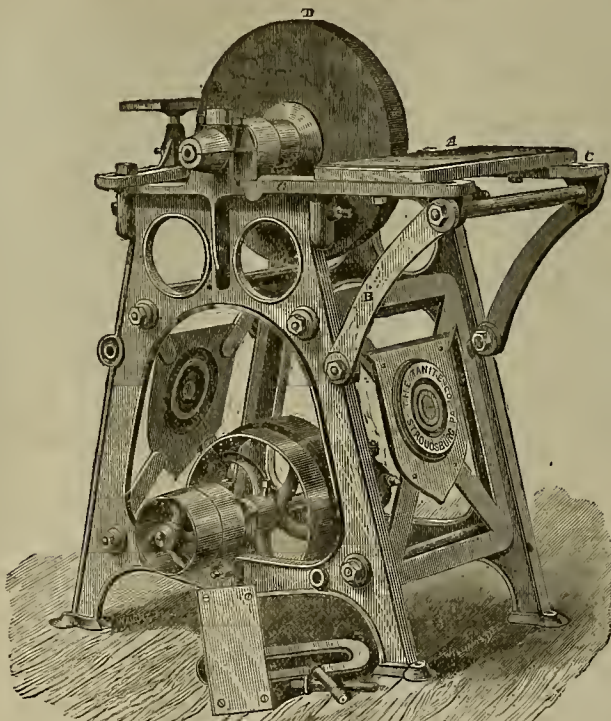
What is thus significantly true of these wheels in mining districts is more than ever true in the great lumbering regions of Washington and Oregon. C. T. Doxey & Co., of Anderson, Ind., write: "When we break several teeth out of our saw, we can cut them all off and cut new teeth in the saw in less than eight hours, and at a cost of \$2.50; whereas it cost us from \$10 to \$12 before we commenced using the Tanite emery wheel. Besides it would take from three to six days to get it done, as we would have to ship it off and await its return. We have seen many a time that we would have lost from \$50 to \$100 had we been without them, in the way of losing time."

John Heuxhurst, of Alexandria, Va., writes: "Our former practice was to file the teeth so as to simply keep them sharp, and when they became too short, send the saws to the manufacturers and have them gummed. When the saw was in constant use this would occur once in about two months and a half, at an expense of from \$15 to \$20, including express charges. By the use of a Tanite emery wheel this is not required, and much is saved in files. There is also a gain in the amount of work by their use. When the saws are sent to manufacturers we have the teeth made as long and slender as they will bear, to save files and time in

filig, and they are not in the most efficient condition till partially worn, and they are also used some time after the teeth are too short to cut easily. By the use of an emery wheel, saws may be kept constantly in their most efficient condition." This is the experience of practical sawyers in the vicinity of manufacturing towns. The advantage of an emery wheel in the hands of an expert sawyer in those western wilds is simply incalculable. It is undoubtedly the indispensable belonging of the modern sawmill plant.

The Tanite company also manufacture grinding machines for the efficient application of their wheels, and are constantly inventing and constructing new styles for specific uses, to meet the ever increasing demands of the various industries.

Their extensive works are located at Stroudsburg, Monroe county, Pa. They conduct their business, however, in their own name under the management of their agents, the well known gentlemen, H. P. Gregory & Co., whose establishments are at 43 Front street, Portland, Oregon, 2 and 4 California street, San Francisco, and 11 Pitt street, Sydney, N. S. W., and who



THE TANITE CO'S REVERSIBLE-REST SINGLE-WHEEL GRINDER.

from these centers can supply the entire Pacific coast and Australia.

We give on this page an illustration of one of the Tanite Co.'s machines. It is a reversible-rest, single-wheel grinder. This machine stands on the floor, to center of arbor 37 1/2 inches. It is especially designed to meet the requirements of machine shops where only one wheel is desired, and also adapted for sharpening and gumming saws.

The last party of government surveyors who came through this part of the country, says the *Virginia Chronicle*, made a scientific examination of the Comstock lode, and after microscopic inspection gave the principal rocks their true names. The footwall, or western wall of the vein, they call diorite, and the hanging, or eastern wall, diabase. The vein matter is pronounced to be a mixture of diabase, diorite and quartz. Hereafter the Comstocker who desires to be strictly correct in his language must bid good-bye to such old-fashioned expressions as bird's-eye porphyry, propolyte, syenite and the like.

It is reported that the late strike in the Horn Silver, Utah, is very rich, the ore assaying 450 ounces silver.

## Re-Locations and Expenditures.

The status of re-located mining claims, forfeited because the required expenditure was not made, is rapidly being determined. There have been many questions connected with these re-located claims; questions plain enough when applied to original claims, but difficult to answer when applied to the re-located ones. In another column we give a decision which determines that any one of a company can re-locate for himself alone a claim abandoned by the company. But the commissioner decides, also, that the labor performed or improvements made by an original locator cannot be claimed by him as part of the expenditures necessary to entitle him to patent for the re-location.

Such a re-location being decided to be valid, the question was, could the re-locator claim the amount of money actually expended by himself for work on the original location as part of the expenditures required by law to entitle him to receive patent for the claim so re-located.

The commissioner very properly rules that

## The Railroad Commission.

The May meeting of the Railroad Commissioners, at which certain important matters were expected to transpire, has been held and there is no change in the condition of affairs. General Stoneman is at open variance with Messrs. Cone and Boerstecher, and as the latter constitute a majority of the commission they propose to proceed to carry out their plans, which is to recommend the schedule of rates arrived at by some kind of consultation between the commission and the railway managers. It does not appear that the new schedule is based upon anything but generalizations, and the essence of the reduction seems to be in the fact that the railway managers will accept it, and thus the public will be saved the cost of law suits.

But it does not appear that the commission is able to agree. There is often some inharmonious spirit to disturb the pathos of the sweetest scene, and intruding upon the betrothal between the commission and the railroads, with such grating words as these:

I believe in a vigorous and persistent policy, lawsuits or no lawsuits. Certainly if the Constitution contemplated a purely peace policy it would not have directed us to go to the courts to enforce our decisions, nor would the Legislature have furnished us with a fund to fee attorneys. I have stated repeatedly that in all probability we should have to go into the courts to enforce any decision made, and I presumed it would take time to carry them into effect. President Stanford told us very frankly and plainly that he would not obey us, and I presumed he meant what he said. But is this Commission to be deterred from the performance of its duties by any such threat? I have also often remarked that the first thing to be decided was as to the possibility of subordinating railroad corporations to control, and until that question was settled and decided we of course were powerless to do anything, and that I was in favor of having the question settled at the very earliest possible period, and that we should avail ourselves of every means placed at our disposal to carry out the law.

How rude to speak of control and subordination so close to the altar. Surely Gen. Stoneman could have withheld his insinuation that either party to so sweet a contract could dream of controlling the other until the wedding bells had ceased their clangor. But the deed is done, and, though the union will be duly proclaimed, there will still be some people who will look for disaster to follow so cruel an omen.

But, in all seriousness, the result of the work of the commission is altogether unsatisfactory thus far, and comes far short of the task set before them by the people. Nothing is settled which is at all essential to the question. The majority of the commission argue that the railway managers show fitting appreciation of the rights of the people. They have reduced their charges before and will reduce them again as fast as the growth of the country warrants reduction by increasing the traffic. Now it does not make the slightest difference in the world whether this is true or not. It might have made a difference before the commission was created, because then the framers of the Constitution might have thought a commission unnecessary, but now, that the commission is ordered and equipped, it makes no difference whether the railroads are enterprising or not. Unless all the evils which the people complain of are removed it is the duty of the commission to investigate them, to arrive at the best possible conclusions, and then take measures to enforce them. If they stop short of this, leave their strength untried and merely accept what is given them irrespective of whether it is a right or a favor, they have fallen short of their duty.

We do not advocate any summary proceedings or measures adopted without due reason. We should not propose any unintelligent chiseling of rates or fares. Such action would work hardship perhaps to the companies, and thus would result in public detriment. But it has been shown that there are ways of arriving at what is fairly due a transportation company for certain services, and it is the public right that such measurement of values really earned should be applied. If the companies deny the right of the people to exercise this control over their operations, then the question of superior rights must be tested. This is what the commission was organized for; and if the present members of the commission do not discharge the duty entrusted to them, their successors will, or the people will know the reason why.

DISCOUNT ON BULLION.—The Sheriff has advertised for sale the Arizona Mining Company's property, at Unionville. This property was at one time valued at \$1,000,000, and the mine produced in a few years some \$3,000,000 worth of bullion. It is said by practical miners who have worked in the Arizona mine, that it is yet valuable, and that there is good ore in sight in the mine. The discount on bullion was the principal cause of the failure of the company, as in the past few years it amounted to over \$40,000.



## Copper Smelting—Its History and Processes.—No. 5.

[By HENRY HUSSEY VIVIAN, M. P.]

In all copper smelting, the first object must be to lose as little copper as possible in the slag, and to make the fusion easy. To this end, the copper smelter anxiously considers the varying nature of his ores. Some contain large quantities of sulphide of iron; these he takes care to roast or calcine highly, in order to obtain oxide of iron wherewith to flux the silicious matter of other ores and to produce a regulus sufficiently rich in copper, his standard in that respect being from 30% to 35%. Some ores containing much earthy matter he finds will not pay for calcining; that is, if he has plenty of ores of the first-named class at his command. The extent to which he calcines his ores depends on their nature and the proportion which one sort bears to the other, his object being to produce in his first melting a regulus, that is, a combination of copper, iron and sulphur, of not less than 30% or more than 35%. Not less than 30%, because if less, the subsequent processes are rendered more costly by the increased quantity which has to be treated; not more, because each pill which is held in mechanical suspension in the slag is richer in copper, and thus increases the loss, while there may even be some danger of getting oxide of copper into the slag. Now, whether this process is conducted in a reverberatory calciner, in a Gerstenhoffer, in a muffle (of which more hereafter), or in heaps as before explained, the objects to be attained are the same in all cases. The merits of the different systems of calcining or roasting may be shortly stated thus: The most ancient, namely,

### Roasting or Burning in Heaps,

Is the least costly, provided the ore is sufficiently rich in sulphur or bituminous matter, as in the case of the Mansfeld Kupferschiefer; but it is not applicable to ores poor in sulphur, and in any case it is very tedious, occupying weeks, or even months, and therefore necessitating enormous stocks of ore in comparison with the quantity treated. The South Welsh calciner, on the other hand, is rapid in its action, never exceeding 36 hours, and for ordinary ores 12 hours, while the quantity treated is considerable and the cost of coal and wages consequently small. Our large calciners at Hafod treat 14 tons each charge, the time of course depending on the nature of the ore we are operating on. It is, I may assume, well known to all whom I am addressing that calciners are long and wide reverberatory furnaces; ours are 28 ft. long by 13 ft. wide (inside measurement), with a comparatively small fire-grate at one end; that the ore is spread evenly over the bed of the furnace, and is occasionally stirred or "padded;" that is, lifted with a flat, spade-like tool, so as to expose fresh surfaces to the action of the flame, which passes in rolling waves along the roof, a stratum of atmospheric air intervening between it and the ore, which supplies the necessary oxygen to combine with the sulphur, arsenic, and other volatile minerals, which are thus enabled to form their respective acid combinations and to pass off in the gaseous form, while the iron and other metals become oxidized. This calcining furnace is simple and under complete control. Any ore can be treated in it, and the process can be arrested at or pushed to any desired point. In this furnace, the sulphur gases are wasted, because they are diluted by the excess of atmospheric air present in the furnace, and they are at the same time rendered impure by admixture with the products arising from the combustion of the coal used for heating the calciner. It has, therefore, never been practicable to utilize the sulphur gases of ordinary calciners for the manufacture of sulphuric acid. In some copper works, calciners with double beds are used. I have tried them, but have found no advantage to arise from them, while they are more costly both in erection and repairs. I have now to notice

### Calciners

Adapted to the production of strong and pure sulphur gases for conversion into sulphuric acid. These are of three kinds, namely: Kilns in which the material is burnt in pieces of the size of road metal; the Gerstenhoffer calciner, in which it is burnt as powder; and the Muffle calciner, which is worked by transmitted heat. I believe other systems have been proposed, but I am not aware that they have been proved to be of practical value.

The Kiln system of burning is applicable only to material very rich in sulphur, say 20% and upward, and in a rough state. It is the system universally adopted in alkali and sulphuric acid works for the treatment of pyrites rich in sulphur and iron and poor in copper. I cannot state the exact limits within which this system is applicable; but I know of instances in which ore as low as 23% of sulphur has been burnt. This system is at once the cheapest and most complete wherever it is applicable.

I next come to the beautiful

Invention of Mr. Moritz Gerstenhoffer, And now known by his name. This invention was brought to my notice by the late Mr. Hermann in 1865. I at once saw its practicability, and caused two experimental furnaces to be built. They were found successful. We purchased the patent, and shortly afterward erected 43 calciners, more than sufficient to treat all our ores and regulus which were sufficiently sulphurous to admit of being thus dealt with. After 15 years' experience, I can say Mr. Gerstenhoffer's invention is still a success. The principle upon which it is based is the same as that of the alkali-maker's kiln, namely, that

the heat of the furnaces should be maintained by the combustion of the sulphur of the material under treatment, and that no more atmospheric air shall be admitted than is necessary to maintain such combustion without fusion of the material, while the resulting sulphur gases shall be strong enough to be available for the sulphuric acid chamber. The alkali-maker was limited to the use of rough material. Mr. Gerstenhoffer solved the problem of using fine material. He constructed a vertical furnace 14 ft. high, 4½ ft. wide, 2½ ft. deep (inside measurement); he placed across it fire-brick bars of triangular form, presenting one flat surface to the horizontal plane, and so arranged in rows above each other that the edges of the higher triangle should coincide with the center of the triangle next below. He heated his furnace to a good red heat by a coke fire temporarily lighted in the lower portion, and when at full heat he withdrew the coke and fed mechanically, through slits in the top, a constant and regular stream of the sulphurous material under treatment which, falling on the highest rows of cross-bars, formed a cone on each, and then fell to the next bar beneath, and so on until each bar of the 70 contained in the furnace received its full charge, while the sulphur in both the falling material and that which lodged on the bars became ignited and burnt by aid of the atmospheric air admitted through holes in the front of the furnace, arranged just above the top of each cone of ore, thus keeping up the heat by the combustion of its own sulphur, and giving off pure and strong sulphur gases, sulphurous with some sulphuric acid. By this simple and beautiful arrangement, the problem of burning fine sulphurous ores and regulus, which had puzzled many a wise head, was successfully solved. I hope from the description I have given that the operation will seem plain and clear to the minds of my hearers, probably far simpler than we have found it in practical working; for I may say that we have only just arrived at what I consider satisfactory working; and when I say "we," I desire to acknowledge the zeal and intelligence which Mr. William Morgan and his son, Mr. William Edward Morgan, have displayed in perfecting this system. For example, I see that when I gave evidence before the Commission on Noxious Vapors, in April, 1877, I produced figures showing that we had during the previous year condensed and made into sulphuric acid 37.93%, say 38%, of the sulphur contained in the whole of the ores we treated; while from figures just furnished me by Mr. Morgan, based on calculations precisely similar to those contained in my answer (10,906), I find that during the year ending July, 1880, we condensed and made into sulphuric acid just 47% of the sulphur which was contained in all the materials treated at the Hafod Works, showing an improvement of about 25%. Again, in that evidence I stated our consumption of niter at 4.53% upon our oil of vitriol, whereas it has now been reduced to 3.3%, mainly by the use of the Glover and Gay-Lussac Towers. I remember when it was 7%; and when our then manager, upon my complaining of this excessive consumption, assured me, and proved by abstruse chemical calculations, that it could not be reduced, my reply was: "Never mind chemical formulae; if you can't reduce it materially I shall take it in hand myself." We are still a long way off the niter consumption of kiln-made acid, which does not exceed 1.3%. I despair, however, from various causes, of ever reaching that low consumption. When I state that we condensed last year 47% of our sulphurous gases, and lost 53%, it must, of course, be understood that I refer to the whole products we treated, many of which are unsuited to the Gerstenhoffer, or any other close calciner. That loss is chiefly due to the melting furnaces and to the last process of roasting white metal into copper. That metal melts at so low a temperature that it is extremely difficult to calcine without running it together, unless an excess of air is present. In a lecture of this nature, which is intended to give a general and popular rather than a scientific account of copper smelting, it will not, I think, be expected that I should dwell at greater length on this or any other single process. Those who desire to see an account of the Gerstenhoffer calciner in more detail, will find it in the evidence I gave before the Noxious Vapors Commission in 1877. It may be interesting to state that we last year condensed 3,666 tons of oil of vitriol (concentrated sulphuric acid), which would otherwise have gone into the atmosphere, and been wasted.

I now come to the third and last system of calcining furnaces adapted to the manufacture of sulphuric acid from copper ores or regulus, namely,

### The "Muffle Calciner,"

Which, in external appearance, is very much the same as an ordinary copper calciner of the old form; internally, however, it differs considerably, since the material under treatment is inclosed in a chamber of fire-brick, constructed by arching over the inner space in such a manner as to cause the products of combustion to pass over and under the ore-bed, and transmit the heat through the fire-brick. By this means, the sulphurous gases are obtained free from admixture with the coal gases, and no more atmospheric air is admitted than is necessary for the production of sulphurous acid and the oxidation of the iron, etc. I have no practical experience of muffle calciners, because I never thought well of them, owing to the expense of fuel consequent on working with transmitted heat, and the dilution of the sulphur gas when the door is taken down for stirring.

(TO BE CONTINUED.)

## The Cost of Milling Silver Ores in Utah and Nevada.—No. 2.

[Read before the American Institute of Mining Engineers by R. P. ROTHWELL, M. E., New York City.]

[Mr. Rothwell now goes on to describe the Stetefeldt furnace and feeders, etc., but as most of our readers are familiar with this, we omit the description. We also condense the remainder of Mr. Rothwell's paper.—EDS. PRESS.]

The following table gives the average cost per ton in labor and material for treating Ontario ore. These figures are kindly furnished me by the superintendent of the company:

ACTUAL RUNNING EXPENSES OF WORKING ONTARIO ORE, ESTIMATED FROM A PRODUCTION OF FIFTY TONS PER DAY.

No. Men	Occupation.	Per day.	Per Ton
1	Foreman.....	\$10.00	20
1	Assayer.....	6.00	12
3	Machinists (4).....	12.00	24
2	Carpenters (4).....	8.00	16
2	Blacksmiths (4).....	8.00	16
2	Engineers (4).....	8.00	16
2	Foremen (8½).....	7.00	14
9	Dry floor (3½).....	81.50	63
3	Battery (4).....	12.00	24
6	Boastmen (4).....	24.00	48
12	Cooling floor (4).....	48.00	96
4	Carmen (4).....	16.00	32
4	Amalgamators (4½).....	18.00	36
1	Retorter (4).....	4.00	8
1	Melter (4).....	4.00	8
4	Laborers (2½).....	10.00	20
4	Watchmen (3).....	12.00	24
3	Ore floor (3½).....	7.00	14
3	Clerks (4).....	12.00	24
66		\$257.50	\$5.15

### SUPPLY.

	\$5.00	\$30.00	\$1.60
Salt, 10 tons.....	.50	87.50	1.75
Quicksilver, 175 lbs.....	4.50	67.50	1.35
Wood, 15 cords.....	8.25	99.00	1.50
Coal, 12 tons.....			.25
Castings.....			.25
Oil and waste.....			.25
Sundries, chemicals, etc.....			.40
Hauling from mine.....			.40
Charcoal, assaying & melting.....			.25
			\$9.87

The above items, aggregating \$15.02, are not, however, the total expense of milling; there is general superintendence, office expenses, repairs, insurance, etc., to be added to this.

### Cost of Milling Silver Reef Ores.

I will cite an example of what are probably the easiest milling silver ores in this country, viz.: those of Silver Reef, Utah. These ores are silver-chloride impregnations of sedimentary sandstones, which crush so easily that a 750-pound stamp will crush through a 40-mesh screen an average of from seven to eight tons per 24 hours. The mills in the Silver Reef district are all small, containing only 5 and 10 stamps, and though they contain as much as 12 pans, with a capacity of 1½ tons to the head of stamps, the battery capacity is in all cases greater than that of the pans. Some of the mills have averaged the month through 8½ tons to the head of stamps; nor does that appear to be a maximum limit. The ore under the stamp disintegrates and passes rapidly through the screens as fine sand; indeed it seems probable that Cornish rolls would crush this ore fine enough for amalgamation, and would do so with wonderful rapidity. As the ore is also remarkably pure, no impurity except a little copper, which occurs in a few of the mines, is found in the hullion. The cost for chemicals is also extremely low. Considering the fact that the mills are so small, and that some of the items are therefore necessarily high, the cost of milling is the lowest of any silver ores in this country:

	LEWIS CO. in 1878.	STORMONT CO. in 1878.	CHURCH M. AND M. CO. in 1878.
12,000 tons.....	\$2.20	\$2.20	\$2.20
9,000 tons.....	\$2.20	\$2.20	\$2.20
14,240 tons.....	\$2.20	\$2.20	\$2.20
Per ton of 2000 lbs.....	2.1	2.1	2.1
Labor and salaries.....	1.22	1.22	1.22
Bluestone.....	.55	.55	.55
Mercury.....	.31	.31	.31
Salt.....	.12	.12	.12
General supplies.....	.41	.41	.41
Incidental.....	.12	.12	.12
Hauling.....	.84	.84	.84
	\$5.12	\$5.12	\$5.12
	2.00	2.00	2.00
	\$7.12	\$7.12	\$7.12

Stormont mill is driven by water-power.

The tailings vary greatly in richness according to the character of the ore milled. From sandstone ore they will carry \$3 per ton, while from the shale ore they may run \$10 or more.

### Milling Comstock Ores.

There has always been a great difficulty, not to say impossibility, in getting reliable figures as to the cost of milling Comstock ores.

The following particulars, though not taken from the books and not "official," are still, I believe, so near the inaccessible "bottom facts" that they may be of interest. The data were collected with care, both during a visit to the mill and afterwards from well-informed sources.

The California mill, Virginia City, is one of the finest in the world and is admirably man-

managed; it contains 80 stamps, which fall 7 to 8 inches, and make 90 to 100 drops per minute. The ores are very easily crushed, and the full capacity of the mill is estimated at 360 tons per 24 hours, or 4½ tons per head of stamps per day; probably the average work is 320 tons a day or 4 tons per stamp; the stamping is done wet. The stamps are fed automatically, and the total number of men employed in the stamp mill per 24 hours is 12, namely, 2 engineers, 4 feeders, 2 firemen, 2 repairers, and 2 binmen.

From the stamps the ore runs through a trough to the pan-mill, situated at some distance down the canyon. In this there are 40 pans running on ore and 4 pans on tailings. The average charge of pane is 3600 pounds of ore worked in 5 hours; the millers run about 90 revolutions, and bear on the bottom or grind. From 12 to 24 lbs. of salt, and about one-third as much bluestone (sulphate of copper) is added to the charge, and after 3 hours grinding 350 lbs. of mercury is added. These quantities vary with the richness and character of the ore. The average loss in mercury is from 2 to 2½ lbs. per ton of ore. The settlers (20) run about 18 revolutions and 2½ hours, and their tailings run into the agitators and thence over the blanket sluices. The labor in the pan-mill per 24 hours is 6 amalgamators, 20 tank shovellers, 2 pan shoers, 2 amalgam-men, 2 engineers, 2 firemen, 5 woodmen, 3 repairers, 3 oilers, 1 retorter, 1 extra roustabout, 1 lamphoy, 2 night watchmen, 2 foremen, 1 superintendent—total, 54 men.

The tailings form about 10% of the ore and are reworked in the tailing-mill, and then run over blanket sluices; this requires 2 amalgamators, 4 shovellers, 1 cartman, 7 blanket-men, and 1 horse blanket-man—15 men. Total in stamp, pan and tailing mills, 81 men per 24 hours; the wages are from \$3 to \$4 per day. The fuel consumed per 24 hours in the battery mill (360 tons) is 80 to 90 cords, and in the pan and tailing mills (360 tons) 38 to 40 cords; total 120 to 130 cords at \$10 per cord.

There are two sets of blanket sluices, each of 6 tables, 300 feet long, with a grade of about 2½". In the first set ¾ of all the tailings recovered is caught, and ¾ in the second set. About 8% of the stamped product is saved in these sulphurets, which assay sometimes \$20. These blanket tailings are mixed with from 3 to 10 pounds of salt per ton, exposed to the air, and then mixed with the tailings of the settlers in the agitators, and the mixture averages, I am informed, about \$7 per ton.

### Gathering Eucalyptus Seed.

EDITORS PRESS:—I would like some information through your paper about the seeds of the Australian gum tree, where they are to be found, what they are to be gathered, etc. We have some trees that are about six years old, and one of them has blossomed during the last two years. There is something that looks like seed on the ends of the fine down of the blossom, and there is something which looks like seed in the little cup under the blossoms. Please give me some information on this subject.—SUBSCRIBER, Sand-Cut Station.

EDITORS PRESS:—I scarcely consider myself competent to fully answer the above, and do it intelligently, as the genus eucalyptus comprises a great many species with which I am not acquainted except through the writings of scientists. Supposing your correspondent has the species more generally known here, *E. globulus*, or blue gum,—the seed may be found, not on the ends of the tasselled flower, but within the seed cup, and resembles black onion seed. The seed cup has four and five cells, running longitudinally from the lower end of the cup up to the stem, and as the seed approaches maturity the opening of these cells gradually expands, the chaff drops out, and lastly the black seed, which is usually in the upper ends. The seed matures the season following the season of flowering; therefore it requires one year to form and ripen the seed before it is fit to gather.

As to the time to gather the seed, much depends on the season. If a cold one it will not be fit to gather before June; if a warm one, in April. It must be remembered the cups always shed or drop the seed before they dry and drop off, and any that do drop off before the cup is containing the seed open are worthless. All the cups do not have seed in them. Usually those of four cells are the most certain, and contain finer seed and more of it. Some trees have little or no seed on them, though full of flowers. In others every cup will contain from 20 to 100 seed. Again on some trees none but the four-celled cups will contain seed; on others both the four and five-celled will have them.

There are sections of the eucalyptus family that are quite different in many respects to the blue gum. The red, the iron bark, the white, the weeping, and many others have seed very fine, so small that no attempt is ever made to separate it from the chaff, and the best way to test the point in these fine-seeded varieties is to gather the little cups, place them in a warm place on a paper, and soon the chaff and seed, if there is any, will shake out together. Now take a piece of white flannel, wet it thoroughly, scatter the chaff over it, fold it up and lay it in a sunny window. Keep it continually moist—dripping wet. In three or four days the little seed will germinate. Look sharp, for in some of the species the tiny seed germ is so very small, the least speck, that it takes a keen and practiced eye to know it.

To answer your correspondent's question fully would require several columns in the PRESS. I have been as brief as possible, but if in my brevity I have failed to be clearly understood, will cheerfully give further explanations.—W. A. T. STRATTON, Petaluma, Cal.



## MECHANICAL PROGRESS.

## Driving Tubular Piles.

It is well known that there is great difficulty in driving tubular piles, but Le Grand & Sutcliffe, of Banhill Row, London, have introduced a new method by which the piles are driven internally at the bottom instead of externally at this top. The system is described in the *Building and Engineering Times*:

The piles are applicable as foundations for heavy structures, or they may be used for the lightest, such as posts or railings. The blow is delivered exactly where it is wanted, being at this point; this is effected by inserting into the tubular pile one end of a cylindrical driving monkey. This is then raised two or three ft. and then allowed to fall upon the flat head of the solid point, the pile itself forming the guide for the driving weight. Almost any length may be used; and in the case of wells, when a great length of pile is often required, they can be lowered through the water length by length, connected together by screwed sockets, until the solid ground is reached. When it is used for poles, posts or columns, the process of driving it into the ground occupies but a few minutes; and when this pole to be bolted to it is made of iron, all that is necessary for fixing is to bolt it to the flange of the pile. For wooden posts an iron socket must be used specially adapted for the purpose into which the wooden post is driven and screwed. These piles may be adapted to numerous purposes, such as telegraph poles, signal posts, flag staffs, tent poles, scaffolding, fencing, lamp posts and the like.

**SPENCE'S METAL.**—This metal compound, having a variety of advantages in non-liability to oxidation, cheapness, etc., is of especial utility to builders, and is described in the *Building and Engineering Times*: It will very probably be long entirely superseded for packing and cementing purposes. This metal fuses at a very low temperature, and can be melted in an iron pot or kettle over an ordinary fire in a few minutes. It is advisable that such a pot or kettle should be a closed one, as the metal, being a compound of sulphur, is liable to catch fire if due precautions are not taken. When heated to the proper temperature of first fluidity, the metal may be poured with ease, and need for the cementing hermetically of pipe joints, the setting of iron railings into stone, and for similar purposes. A great advantage this metal has is that it expands at the moment of solidification, and thus entirely and hermetically fills any recess into which it may be poured. This property of high expansibility at the moment of solidification renders it of great value for obtaining sharp impressions from intricate molds, and the most perfect casts of busts, statues, medals, has reliefs, etc., are thereby obtained in it. It may be colored to resemble bronzes, and consequently produces a most artistic effect. It is recommended also for repairing and even covering roofs instead of asphalt or lead flashing, as it is perfectly waterproof and water-tight and very light. It is not liable to oxidation or corrosion in the least degree, and may therefore be extensively adapted to the lining of tanks and the making of acid bottles, etc.

**GAMGEE'S MOTOR.**—Prof. Gamgee's "zero motor" has been exciting considerable attention at Washington, and scientific men are inclined to set a high estimate on its value. One of the examiners in the Patent Office tells us he regards it as the most important patent since telephone. If it succeeds at all, however, it will be of far greater consequence than that of any invention of recent times. Briefly stated it is designed to utilize the expansive force of ammonia gas as a motive power. In Chief Engineer Isherwood's report on the subject to Secretary Hunt, a document which has called particular attention to the invention, he declares the plan as devised by Prof. Gamgee as "far from chimerical." It is based on well-demonstrated thermo-dynamical principles. The whole is definite and precise, both in theory and mechanical detail, nor can it be shown, *a priori*, that there is not a fair prospect for success. The motive power, practically, being water as against coal, it is needless to say the new engine, if found practicable on experiment, must work a revolution in mechanics, superseding the steam engine, as that has taken the place of less economical mechanical powers. Prof. Gamgee is sanguine of complete success, and from his standpoint of prophetic vision, steamship and railroad companies and manufacturers are menaced with a rival more portentous than hangs over the gas monopolies; for the new force is the foe to all monopoly. —*Coal Trade Journal*.

**PULVERIZED COAL.**—The experiments of the Alexander Steamship Company in burning pulverized coal, or culm, continue to be very satisfactory, and are regarded as promising entire success. They will persevere until they feel warranted in introducing the process on board their steamers. The experiments, as we are informed, are directed chiefly to two points; one relates to this construction and position of the retort or lining of the furnace; the other, to the force of the blast used in atomizing the coal. When the latter is rightly graduated, there are neither ashes nor smokes. If it is not strong enough, a part of the coal dust falls unconsumed.

**A RACE AT NAIL FEEDING.**—The *Wheeling News Letter* of April 3d says: This nail-cutting contest between the Belmont and Top mill factories came off last week and resulted in a victory for the latter. At the Top mill the total amount of nails cut was 7,061 kegs. The men worked 11 hours each day and 110 nail machines were employed, several of which, however, were idle at times during the week. The largest previous output of the factory in one week was 6,876 kegs, working on the 12-hour system. The following will show that the boys put in their time to advantage: Bernard Bart, on 30d., cut 265 kegs; James Kenney, 20d., 222 kegs; Thomas Tagg, 8d., 85 kegs; Robert Ditty, 12d., 125 kegs; Joseph Siple, 10d., 113 kegs; Daniel Crimble, 6d., 53 kegs. Each of these is said to be above the best week's work ever done before in the city on the same grade of nails on the 11-hour system. The Belmont feeders enter a decided protest against any statement which engaged them in a contest last week. They say they only worked along as usual, without notice or knowledge of the extraordinary efforts being put forth by their would-be contestants. The exact number of kegs turned out by the Belmont was not learned, but it is known to be several hundred less than the number made at the Top. One of the Belmont attaches informed the reporter yesterday that their factory turned out on an average, over 6,000 kegs of "good nails" a week when running full, and claimed that this was a better showing than that of any other establishment of equal facilities in the city.

**FREAKS OF CASTINGS.**—Castings, says a contemporary, seem to manifest peculiar freaks and irregularities for which it is difficult to find a cause. They occur sometimes in the sand, sometimes in the venting, and often with wrong facings. For instance, the quality of facing sand must always be graded, according to the casting to be made, heavy or light, deep or shallow in the mold. Again, inferior coal in facing sands is detrimental. Possibly the dealer in foundry facings has been grinding inferior stock, instead of getting a carbon in the form of coal dust to stand the iron pouring against the mold. There has been dirt and elate ground in with the coal. This is a cause of scabby castings, together with too fine a sand or a sand without a body, which all molders dread except for very light work. If molders could only have good sands, good irons and good facings, and the same stock supplied each time, there would be little need of complaint; but the geology of our country is not such as to admit of digging molding sand at every back door, when molding sand costs from \$40 to \$50 a car delivered in a foundry yard, as we know it does in many instances.

**INCREASING THE TENACITY OF IRON.**—*La Charbon* says that M. Leguin, of Paris, has patented a process for increasing the resisting power of iron goods to tension bending, or torsion, by immersing them wholly or partly in hot diluted sulphuric or hydrochloric acids, or in a mixture of one part of turpentine in five or six parts of water. In the acid process, the metal is raised to cherry red heat, and then dipped in a solution of equal parts, by volume, of sulphuric acid of 66° strength, and of water. In this turpentine method, the mixture must be kept constantly stirred, lest the spirit should float upon the surface and take fire, on the introduction of the glowing metal. In either process, the metal is held in the solution till it has sunk to the temperature of the latter, and is then quickly thrown into cold water. The various implements, such as hooks, levers, beams, etc., subjected to this process, need only be partially immersed in the solution, the portions selected for treatment in each case being, of course, those which will necessarily be subjected to the greatest strain when in actual use.

**A MECHANICAL TRAIN ENUNCIATOR.**—A new device, the invention of a Canadian named Chasse, which, it is thought, will attract attention in railroad circles, consists in a new mechanical train enunciator. A common wire is stretched the length of the track, a little on one side of it, and a short distance above this cab. This wire is swept by a metallic fan while the train is in motion, thus keeping up a communication along the line. In each cab are a gong and a dry battery with a ground wire running to the axles of the locomotive, while at the distances of every mile the rails are grounded with a ground wire. In every depot are two gongs, which automatically ring when a train approaches within three miles in either direction. Two trains approaching each other also break the circuit, causing the bells in each cab to ring an alarm. A recent trial of the device at Chillicothe, Ohio, was very successful, and elicited the favorable verdict of the railway officials present. A practical and reliable mechanism of this character must add very materially to the security of railway travel.

The capacity of the steel works of the world at the present time is estimated at about 3,000,000 tons per year. The Bessemer works of the United Kingdom with 120 converters contribute to this total from 750,000 to 800,000 tons; the United States, with probably half as many converters, but said to be superior plant and management, produce 750,000 tons or more. Germany has lately increased her capacity for steel production, and at present can produce about 500,000. France produces 275,000; Belgium, 150,000; Austria, 250,000; and Sweden and Russia about 150,000.

## SCIENTIFIC PROGRESS.

## Eucalyptus Leaves and the Atmosphere.

H. N. Dreper writes for *Chambers' Journal* an article concerning the eucalyptus in the Roman Campagna. We take therefrom two paragraphs which will interest growers of the tree everywhere, both in showing how rapidly the trees exhaust moisture from the soil, and the influence of the leaf-exhalations upon the atmosphere:

The question of how and why the eucalyptus exercise sanitary changes so important as those which have been effected at this little oasis in the Campagna, may be best answered when two remarkable properties which characterize many of the species have been shortly considered. The first of these is the enormous quantity of water which the plant can absorb from the soil. It has been demonstrated that a square meter—which may roughly be taken as equal to a square yard—of the *Eucalyptus globulus* will exhalate into the atmosphere, during 12 hours, four pints of water. Now as this square meter of leaves—of course the calculation includes both surfaces—weighs two and three-quarter pounds, it will be easily seen that any given weight of eucalyptus leaves can transfer from the soil to the atmosphere nearly twice that weight of water. M. Valles does not hesitate to say that under the full breeze and sunshine—which could necessarily form no factor in such accurate experiments as those conducted by him—the evaporation of water would be equal to four or five times the weight of the leaves. One ceases to wonder at these figures, on learning that it has been found possible to count, on a square millimeter of the under surface of a single leaf of *Eucalyptus globulus*, no less than 350 stomata, or breathing-pores. And it now begins to be intelligible that, if such an enormous quantity of water can be transferred from earth to air, it may be possible that an atmosphere, which without such aid would be laden with malarious exhalations, may be rendered pure by this process of leaf distillation; the putrescent constituents of the stagnant water are absorbed by the roots, and become part of the vegetable tissue of the tree.

But this is not all. Like those of pine, the leaves of all species of eucalyptus secrete large quantities of an aromatic essential oil. It has recently been shown—and this statement has been impressively put by Mr. Kingzett—that under the combined action of air and moisture, oils of the turpentine class are rapidly oxidized, and that, as a result of this oxidation, large quantities of peroxide of hydrogen are produced. Now, peroxide of hydrogen is—being itself one of the most potent oxidizers known—a very active disinfectant; and as the leaves of some species of eucalyptus contain in each 100 lbs. from three to six lbs. of essential oil, we can hardly avoid the conclusion that the oxygen-carrying property of the oil is an important element in malaria-destroying power of the genus. Moreover, the oxidation of the oil is attended by the formation of large quantities of substances analogous in their properties to camphor, and the reputation of camphor as an hygienic agent seems sufficiently well founded to allow us to admit at least the possibility of these bodies playing some part in so beneficent a scheme.

**THE OCEAN LEVEL.**—M. H. Trautschild, of Moscow, lately sent in a paper to the Geological Society of France, maintaining that the level of the ocean was not invariable, in which he expressed the following conclusions: 1. The level of the sea has fallen, as parts of the earth's crust have risen from the bottom above its surface. 2. The surface of nearly all the continents has once been at the bottom of the sea, and has risen from the waters, partly in consequence of upheavals, partly in consequence of the retreat of the ocean. 3. When the continents have been formed, a part of the waters of the sea is carried away from them, and held on the land as lakes, rivers, eternal snows and as a constituent of organic matter—thus the quantity of water in the ocean has been constantly diminished, and its level has fallen. 4. As the earth cools, ice accumulates near the poles and on the mountains, water is soaked down more deeply into the crust of the earth, and mineral hydrates are formed everywhere. It follows that the level of the sea has been gradually falling ever since water has existed as a liquid upon the earth.

**THE DISCOVERY OF URANUS.**—One hundred years ago, the 13th of March, 1781, in the garden of a small house in Bath, England, an amateur astronomer was, by the means of a 20-ft. reflecting telescope, hard at work on his catalogue of stars in the constellation Gemini. His attention was attracted to one he had never seen before and not registered. Quickly applying a high magnifying power to the mysterious visitor from parts unknown, it presented a sensible disk, and proof was soon found that it changed its place among the fixed stars. The astronomer was Herschel; the unknown star was Uranus. Plain Mr. Herschel of Bath, the musician-astronomer, became famous, and honours clustered around him during his peaceful life, till in his 84th year he joined the majority.

**BEEGERITE, A NEW MINERAL.**—Prof. George A. Koenig describes, under this name, a new metallic mineral occurring at the Baltic lodes of the Geneva mining company, in Park county, Colorado. It is a sulphide of lead, copper and bismuth, having the composition (Pb Cu)₂ Bi₂ S₃, and is therefore related to the minerals cosalite and schirmerite, described by Dr. F. A. Genth from American localities. The following characteristics describe the new mineral, beegerite: The mineral occurs massive and crystalline; in the former condition it is light gray, and in the latter dark gray in color, and with strong metallic luster. This crystallization is isometric, with orthorhombic habitus. The crystals are mostly small, but as one was large enough to be measured, the cosmetic symmetry was fully established. The prevailing combination appears to be the cube with octohedron; cleavage cubical, eminent; specific gravity=7.273. Dissolve slowly in cold concentrated hydrochloric acid, but rapidly when heated. The same author describes a new locality for jarosite, in Chaffee county, Colorado, and states as the result of his investigation that this mineral is identical with alunite, the two being identical in form and structure, and forming, in fact, one species, in which Al³ and Fe² may enter singly or in any proportion, replacing each other.

**DISINFECTION OF SHIPS.**—San Francisco is, like most seaport towns, particularly liable to small-pox epidemics. It is, in fact, in a worse condition in this respect than most cities, since it is here that the Chinese immigrants first touch our shores. Our quarantine laws, though good in themselves, are not always administered so much to the satisfaction of the citizens as to the passengers on the steamers. The steamers are disinfected, or supposed to be, as soon as the passengers leave, for they must be ready for the return trip in a few days. In this connection it will be a matter of interest to know the system of disinfection for ships adopted by the medical experts of the Australian government, which we take from the *Scientific American*. It is as follows: Sulphur to the extent of 12 grains per cubic meter of the space to be disinfected was first burned in an earthenware vessel or basin, placed in the center of a mass of sand to prevent all risk of fire; every article of clothing, all the linen, etc., were hung across the cabin, the latter being then hermetically closed for three hours, and afterward exposed to the strongest possible drafts of air for 12 hours; finally, the walls, floor, ceiling, etc., were washed with one kilogramme of lime, or one-half kilogramme of chloride of zinc, to every hundred litre of water.

**PYRAMIDAL SECRETS.**—A Cairo (Egypt) despatch of May 3d says: "Maspero has just opened some more pyramids of the Sakkaro, enclosing the tombs of the kings of the fifth dynasty. The mortuary chapels of each contain about 60 square meters of the smallest and most closely written texts, giving precise details of the religious belief of that age. It is a complete *coup de grace* to the Ostris Masmic theory, and all previous conceptions are entirely upset. Except the finding of the Rosetta stone in 1799, no discovery in Egypt equals this in scientific value. The entrance passage is difficult and dangerous on account of the loose blocks that encumber it. An American Egyptologist and a correspondent are the only persons allowed to visit the interior with Maspero. The latter explorer returns to Paris next month, and will publish the discovered texts. All the Sakkaro pyramids, about 60 in number, will be opened as soon as possible.

**INTERESTING ARCHAEOLOGICAL DISCOVERY.**—A recent freshet of the Coosa river, Georgia, washed away the surface soil from a large tract of land. After the water had subsided the washed land was found to be an ancient battlefield and burying ground. Part of the territory consisted of mounds, evidently fortifications. These were strewn with implements of aboriginal warfare, beads and earthen vessels. The remainder of the ground was covered with skeletons, all perfectly exposed, and all in good preservation. A press dispatch from Rome, Ga., dated April 2d, says: "This place is attracting crowds from all directions, and it is almost impossible to prevent vandalism from seriously impairing what will undoubtedly prove to be one of the richest 'finds' ever made on the American continent. Among the countless number of Indian pipes found, is one of great size and exceedingly fine workmanship, the bowl of which is carved with great skill into the form of a human head."

**PHOTOGRAPHING A LIGHTNING FLASH.**—A very distinct photograph of a lightning flash was taken by Mr. Crowe, of Liverpool, during the severe thunder storm which visited that city on July 17, 1880. The flash, which has been made to photograph itself by its own light, appeared over St. Philomen's church at this instant the bell tower was shattered to pieces. It exactly resembles the zigzag spark of an induction coil, and is estimated to have been about 51 inches broad.

**A CURIOUS INSTANCE OF THE DEODORIZING OF ILLUMINATING GAS** was cited by Prof. Renson in a recent lecture on "Coal Gas." In Dresden a quantity of gas escaped from a pipe outside of a dwelling and passed through the earth into the house, with its odor entirely gone. It was breathed unconsciously, and several deaths occurred in consequence.



## MINING SUMMARY.

CALIFORNIA

**NYO.**  
**BEVERIDGE MATTERS.**—Inyo *Independent*, May 7: The Mexican owners, comprising the Keynote Co., have just effected arrangements to have their ore reduced at T.

tal stock, \$10,000,000. Directors—George Schultz, W. C. Walker, Henry Mill, Jesse W. Brown, Wallace King

**MEARIMAC M. Co.**—May 11. Location, California. Capital stock, \$10,000,000. Directors—George Schultz, W. C. Walker, Henry Mill, Jesse W. Brown, Wallace King.

IN northern Sonoma work progresses at the Mount Jackson quicksilver mine, and E. G. Hall is now engaged in refitting the furnace. The new Burleigh steam drill works well, doing the work which formerly required several men. The Great Eastern mine is about free from water again, and is prospering as usual.

tal stock, \$10,000,000. Directors—George Schultz, W. C. Walker, Henry Mill, Jesse W. Brown, Wallace King.







## An Important Mining Decision.

### The Richmond-Albion Suits.

The following is the text of the decision filed in the Richmond-Albion suits: Sixth District Court—Richmond Co., of Nevada vs. Albion Con. Co.; Richmond Co. vs. Albion Co.; E. H. Rose *et al.* vs. Richmond Co., of Nevada. The cases were heard upon rules to show cause for an injunction *pendente lite* between the respective parties, and for the purposes of the decision were consolidated. The property in controversy is situated upon Ruby hill, Eureka mining district, and is a limestone formation, containing well-defined boundaries of quartzite and shale. The ore bodies are found by crosscutting in the limestone from wall to wall, at varied and uncertain distances from each other. In the case of the Eureka Con. Co. vs. the Richmond Co., the character and nature of this mining ground was determined by the Circuit Court to be a vein or ledge within the meaning of the Act of Congress of 1872. The United States Supreme Court has recently affirmed this decision.

The testimony introduced upon the hearing of these cases before me established the same state of facts. Therefore, the ruling of the Circuit Court upon this issue is followed and adopted. The Richmond company claim the disputed ground by virtue of the Virginia and Poor Man locations, the St. George patent, and several other claims, but which are subordinate to the Uncle Sam. The Albion company bases its ownership to the same premises upon the Uncle Sam location which it owns. The cases were so ably and thoroughly tried and presented to the court by the learned counsel engaged, that I deem it unnecessary to express my opinion, though I shall do so as concisely as possible as to the merits of some of the asserted rights. The Richmond Co. is the owner of the Tip-Top patented claim, which is the northerly one of the series of claims owned by the Richmond. It was a seriously contested point where the westerly or northerly end of the Tip-Top should be established, the Richmond claiming it to be the line as defined in the patent, the Albion contending that the Tip-Top location was originally made and the stakes placed at positions 12 ft. southerly from the patent line. As announced during the trial, the westerly or northwesterly course as described in the Tip-Top patent will be adopted and fixed as the extreme limit of the Richmond Co.'s ground, horizontally and vertically, and as the line which must control as applying to the injunction to be issued. Northwesterly from this line lies the ground in contention. The Virginia is a prior location to the Uncle Sam, having been made about December, 1869. The Richmond Co. claims that this location contains 1,400 ft. in length, and to extend 298 ft. over and upon the disputed territory; that the notice of location was placed at what was called the iron shaft, running northerly, while the Albion insisted and proved the fact that the Virginia location was made only to cover any vacant ground that there might be between the Lookout and Richmond claims, and was of the length only of those claims.

### The Virginia Notice of Location

Calls for the Mayflower as one boundary and the Champion as the other. The Champion lies to the southerly and the Mayflower to the northerly of the Richmond and Lookout locations. The boundaries are called for in the notice will control the limits and extent of the claims, especially when the testimony as to where the location was really made is conflicting. From that and other testimony adduced upon the question, I conclude that the Virginia claim, as located, does not include or embrace any of the ground in controversy, and that the Richmond company has no right or claim to any part of this property by reason of the Virginia claim. The Poor Man was located in 1869, and is a claim nearly at right angles with the other locations, and its side lines would become the end lines. The Poor Man covers only a portion of the ground, but so far as appears its boundaries were never defined or fixed. Some work was done upon the claim until 1874. Among other serious and fatal objections urged against the validity or vitality of the claim is the one that upon the application for a patent having been made which affected the Poor Man ground, the

### Poor Man Co. Having Failed to Protest,

It resulted that any adverse right claimed by the Poor Man company would thereby be forfeited. The Uncle Sam was located January 14, 1872, by Rose and two other associates. The claim was made for 800 ft. on the ledge by 200 ft. wide. The act of Congress of 1866 gave to each locator 200 ft. on the vein, and an additional claim of 200 ft. for discovery. The location having been made for 800 ft., it is contended by the Richmond company that it is invalid, because 200 ft. of ground was taken in excess of that allowed by law. It was shown that Rose did work on this ground some six months before the location was made, and discovered what he claimed to be a ledge. He considered it a discovery. Subsequently he made this location for 800 ft., claiming the additional 200 ft. for the discovery, although the notice itself does not so mention. The evidence admitted was competent and sufficient to satisfactorily explain why 800 ft. instead of 600 ft. had been appropriated, the fact established being that the additional 200 ft. was for discovery, and I am aware of no rule of law which would require that fact to be stated in the notice or operate as a forfeiture of the location if not done. The proof is ample to sustain the validity of the Uncle Sam location for 800 ft.

by 200 ft. wide. It was insisted that the Uncle Sam company had claimed

### Different Lines for their Claim at Different Periods.

Upon making the location, Rose selected the place where he had first done his prospecting, a small hole, then in the center of his claim. After the location, he commenced a shaft at this point, and the work done on the claim afterward was in sinking this shaft to a considerable depth, which is called the Uncle Sam shaft. This is a known point, a prominent object, and being the initial point, must govern in defining the proper limits of the claim. The ground which the Albion company is entitled to possess by virtue of the Uncle Sam location is that taking this shaft at the center and extending therefrom with the ledge 400 ft. each way, with a surface width of 200 ft. The St. George claim was located in 1872, subsequent to the Uncle Sam, and occasions the material conflict in the case. The St. George company applied for a patent, to which application the Uncle Sam company protested. It is urged that the protest filed by the Uncle Sam owners is fatally defective. I have carefully examined the objections made to the protest, and have been unable to find any material omission or departure from the requirements of law which would vitiate it. The affidavit of the claimants, accompanied by the diagram of the ground, sufficiently manifested the nature and extent of the conflict. I am convinced that the protest, in all essential particulars substantially conforms to

### The Requirements

Of the law, and is perfectly available for the purposes intended. Rose *et al.*, the protestants, in October, 1873, commenced the action above, entitled Rose *et al.* vs. Richmond Co., averring title to the Uncle Sam ground. Issue was joined by the defendants in the case pleading the St. George location. The case was placed once upon the trial calendar and continued at the request of the Richmond Co. It was proven that some time in the spring of 1874 Mr. Corrigan, President of the Richmond Co., while upon a visit to Eureka, represented to Rose, and Rose to his attorneys that the Richmond Co. did not desire any litigation with him in regard to the Uncle Sam mining claim, that being the prior one. A tacit understanding was arrived at whereby the Richmond Co. would not interfere with the Uncle Sam ground, and litigation between them should cease. The case was not therefore, again placed upon the calendar, but remained pending, and was permitted to repose without prosecution. About October, 1876, the Richmond Co. procured from the County Clerk of Eureka county a certificate to the effect that the case had not been placed upon the calendar for trial for several terms of court, and filed this with the Receiver and Register, who thereupon recommended that a patent issue to the Richmond Co. for the St. George mine. Upon this the Commissioner of the Land Department decided that the case had

Not Been Prosecuted With Such Diligence As the act of Congress requires, and issued the St. George patent May 7, 1877. The important question presented is whether the Albion Con. Co. can assail this patent in this case by way of an equitable defence, or whether a direct proceeding must be resorted to to cancel the patent. The action of the Richmond Co. vs. the Albion Con. Co. is in the form of ejectment to recover this ground, relying upon the St. George patent as title. The Albion Co. has fully answered, setting up the claimed equities, and asking that the Richmond Co. be decreed to hold the St. George patent in trust. Under the code of this State, law and equity are blended, and the defendant may avail himself by answer of as many defences as exist. The Richmond Co. is seeking to recover this property from the Albion by force of this patent. It is the muniment of title, and I can discover no sufficient reason, upon principle or authority, for denying the defendant the right to assail this patent in this action for the same causes and upon the same grounds that it would assign originally to a Court of Equity to obtain the same relief. I cannot conceive of any forcible or tangible objection that can be opposed to this proceeding, the State having full jurisdiction.

### To Afford Equitable Relief

In all properly presented cases. The United States Supreme Court has sanctioned this right and practice in several cases. I therefore conclude that the Albion Con. company, being the equitable owners of the Uncle Sam ground covered by the St. George patent, is not compelled to resort originally to a court of equity, but that it can obtain the desired relief from the effects of the patent in this action upon the trial of this case. The succeeding question is, Did the commissioner exceed his power in determining that the suit of Rose vs. the Richmond company had not been presented with diligence? Upon this question there can be no doubt. The act of Congress provides that when a protest is filed to an application for a patent, that the party protesting shall commence an action in the State court to determine the contest, and that thereupon all proceedings shall be stayed in the Land Office. Upon the commencement of this action, the Land Department is divested of all further jurisdiction of the subject matter until the court shall have finally determined the controversy between the parties. The court acquires and possesses the exclusive jurisdiction of the entire matter. The question of whether the action is prosecuted with diligence is one for the court to

decide, and not the commissioner. To hold otherwise would be to allow the commissioner at all times to deprive the court of its jurisdiction and of determining questions which the court alone has the right and power to adjudicate. I must pronounce the action of the commissioner, in deciding that the Rose case had not been prosecuted with diligence, as wholly without power, and his act of issuing the St. George patent while the action was still pending in courts undetermined as lawful, entirely without jurisdiction or authority, and of committing a wrong which equitable interference alone can redress. From the foregoing, while it is already demonstrated that the Albion company will be decreed to be the owner of the disputed ground, and of the Uncle Sam claim, unaffected by the St. George patent, still there is no power in court upon this hearing to grant the relief which it is so assuredly entitled to, and I can only express my convictions as to what must be the evident result upon the merits. I should not hesitate to dissolve the injunction against the Albion company, except for the reason that the legal title to the Uncle Sam ground, covered by the St. George patent, stands in the name of the Richmond company; and as the Albion company can only obtain the relief which it is so eminently entitled to from the operation of this patent by decree at the trial, until that shall be accomplished I shall consider it to be my strict duty, in the endeavor and anxiety to do

### Exact Justice and Equity,

That in the meantime the rights of both parties should be scrupulously protected and the mine preserved, which is represented to be valuable. For this reason alone I am persuaded that all parties should be prohibited from invading or destroying the substance of the property. It is therefore ordered that the restraining order heretofore issued in each of the above entitled actions will be continued in full force, taking the Tip Top line, as indicated in the boundary line, until the further order of the Court. Bonds to be fixed by the District Court.

RICHARD RISING, District Judge presiding.

## Summer Resorts in Tehama County.

The celebrated Tuscan springs are located east of Red Bluff in the foothills of the Sierras. They are reached by a pleasant ride of eight miles from the Bluffs. Good accommodations are furnished by Mrs. Bradley, who is proprietress of the springs and the accompanying hotel. There are many walks and drives constructed in different directions, in such a way as to add pleasure and comfort to health seeking. The climate is very desirable, owing to the fact that the site of the springs is at just such an elevation as to give a medium temperature, somewhat removed from the heat of summer and still warm enough to be enjoyable in winter.

In the adjoining mountains and valleys are afforded the finest of opportunities for fishing and hunting, but the principal consideration is the medicinal qualities of the waters of the springs, for they strengthen for active life those who are weak and ailing, either in mind or body. In 1854 a learned scientific man, Dr. Veech, discovered that the waters of these springs possess medicinal qualities of great value. The waters are pronounced by the best chemists and most learned physicians to possess qualities equal to almost any waters in the United States. For the cure of rheumatism, dropsy, neuralgia, liver complaint, paralysis, dyspepsia, catarrh, etc., these waters are unsurpassed on the Pacific coast.

### Toome's Camp.

This is a beautiful summer resort, situated about 35 miles southwest by west of Red Bluff. Its elevation is about 5,000 ft., and consequently clear above all effects of the oppressive heat of the summer months in the valley. To this camp there is a good wagon road, comparatively easy of ascent. The sighing of the magnificent forests of evergreen, rippling of mountain streams, beauty of flowers and singing of birds, and coolness of the refreshing waters, quaffed from nature's own bosom—the graciousness of such shade and a general exhilaration through one's whole nature, causes him to feel that he is, at least for a while, entirely free from all worldly anxieties and cares, and has found what might almost be called a paradise upon earth.

This camp is frequented by from 50 to 100 persons during the summer months. In every direction from here are places of interest. South Valley Valley, 14 miles distant, is reached by a plain and easy trail leading to the northwest. On all sides of this peak may be found beautiful streams, valleys and lakes. One place is deserving of particular mention, called Solomon's Pool. It is sort of a meadow, nearly level and in a circular form, being about 200 yards across. On all sides but one it is surrounded by high walls, nearly perpendicular and rising in some places several hundred feet high. Down from the heights of the hoary sentinel, covered always with perpetual snow, come streams of the clearest and brightest water, fresh from the mighty masses of snow above. Several of these, after rippling and sparkling, dashing and tumbling, foaming and falling, and roaring, unite and form a stream of larger size which, seemingly, wearied with its exertions, gladly chooses a passage through so beautiful a valley as the one above mentioned.

While passing through Solomon's Pool, this stream slackens its course and during its passage moves along as quietly and stately as a valley stream. Soon, however, it has made the passage, and having sought the only outlet from this pleasant retreat, goes rushing on to its mother stream, the Cottonwood, which takes it after its perilous journey, and hears it still downward. There are just enough of the most beautiful evergreens near the opening of this circular valley to make a beautiful camping place. The best of grass grows luxuriantly over its whole surface; in fact the whole surroundings are such as to make this one of the most enchanting scenes I ever witnessed.

Hensley springs, and Sulphur springs are also situated in the Coast Range mountains, nearly due west of Red Bluff. Both of these claim peculiar medicinal qualities; space forbids me, however, to write concerning them. All the resorts of the Coast Range are comparatively difficult of approach, and consequently much less frequented than those of the Sierras. In Big valley and all the surrounding country, ere many pleasant resorts at which a great portion of the people of Red Bluff and the surrounding country spend a portion of the summer, camping out in the free air of heaven, and enjoying a few weeks spent in fishing and hunting, thus becoming strengthened and prepared for the arduous labors of another year of husy toil and anxiety.

The climate of the Coast Range is considered better for invalids, especially so for those who are consumptive, as the air of the Sierras is too moist and the nights too cold.

The proximity to the Pacific ocean tends to render the climate of the former more agreeable. Game is also more abundant there. For these reasons, were it not for the fact that the ascent of the Sierras is more easily accomplished, the greater portion of the health and pleasure seekers would go west instead of east.

The scenery, climate, etc., are magnificent in both mountain ranges, and, in fact, in every part of Tehama county. I will close with the following from our "County History."

### Magnificent Panorama.

There are not many other places, if any, in the United States that afford a finer or a grander view than is obtained by one standing at Red Bluff. It is a magnificent panorama of mountains and valleys; of hills and dales; of tropical groves and snowy peaks—a scene to enchant the poet's mind or to charm the worshippers of nature. Away to the right rises, in abrupt and craggy cliffs, the clear outlines of the Coast Range.

In winter they are mentled in a heavy coating of snow, whose lighter folds fall over the lower hills, where its whiteness is here and there relieved by the rich green of the forests of pine.

Five thousand feet high and 40 miles distant, in the clear air, every ridge and gully, every gap and peak are distinctly visible.

Away to the east rise in snowy grandeur the rough and rugged ridges of the Sierras. Rising gradually from the south they culminate in Lassen's Buttes, a cluster of volcanic cones which rise over 10,000 ft. above the sea. In winter they are covered deep with snow, but in summer only sufficient remains in the canyons on the northern slopes to give them a hanged appearance. In front and far away to the north, beyond the boundaries of the county, the eye wanders over the Trinity, Scott and McCloud mountains, and is almost lost in their wandering ridges.—S. A. Stiles, in *Rural Press*.

## The Growth of Pinal City.

Certain occurrences mark the growth and progress of a place, which the daily current of events do not impose upon our observation. Mr. Disturnel has been here and taken items for his new Arizona Business Directory and Gazetteer for 1891. He showed us his figures. He found in Pinal about 100 business men, exclusive of Silver King and Queen City, which, together, will make up about 150. He found about 140 in Globe, about 400 in Tucson and a few more at Tombstone. Our existence as a town, hurch, or city dates back about two years. We had scarcely an existence then. Nor can we measure ourselves as the equal of Globe, which is years our senior, and with the Pueblo Viejo itself, the ancient Tucson, for we exceed already one-third in business men numerically of that fasthold of citydom. The amount of business done at Pinal, King and Queen, for they are melting together rapidly and are now in fact one, run up into the rate of millions annually. Our immense stocks of merchandise and the activity apparent at every step tells the whole story. The road is lined with teams between Pinal and Casa Grande, and still they cannot clear the depot there of freight for Pinal. We do not wait for crops to ripen, nor for ships to come home from sea. We take thousands daily out of the earth, and scatter them over the area of business and life and enterprise. We have not only the Silver King, the richest and best paying mine in the world, but we have 100 mines around Pinal, already further developed than was the Silver King two years ago. And endless is the prospect, for the mountains all around us are hrimful of precious mineral. The immediate future of Pinal is indisputable, its future greatness is a certainty, its permanency incontrovertible.—Pinal Drill.

SWITZERLAND.—All the tunnels on the south side of the Alps are now bored, and the plecting of Tassin in direct railway communication with the rest of Switzerland is only a question of a few months.



## THE ENGINEER.

## Comparative Corrosion of Iron and Steel.

A paper was recently read before the Institute of Civil Engineers (England), by Mr. D. Phillips "On the Comparative Endurance of Iron and Mild Steel when Exposed to Corrosive Influences." The author was a member of the committee appointed by the Admiralty in June, 1874, to inquire into the cause of corrosion in boilers, and since the dissolution of the committee he had made further experiments with the same object in view. The results were given of numerous tests, the surfaces of the specimens in nearly all cases being bright. From an abstract of the paper in *Iron*, we take the following extract from that portion where the author referred to a series of experiments with iron and steel plates (crucible, Bessemer and Siemens steels, and Staffordshire and Yorkshire irons), suspended in the boilers of ocean and coast-going steam vessels belonging to various shipowners. The exposed surface of each plate was 37.89 square inches. Taking the results from 56 sets, the percentage in favor of the iron over the Bessemer and Siemens steels was 21.3. The different results obtained from some of the sets might be thus summarized:—No. 43 set was suspended in the boiler 285 days. The boiler was filled 14 times with fresh water, two inches of water being blown off daily. No. 2 set was in the boiler 311 days. The boiler was filled eight times with fresh water, and five times with sea water, three inches of water being blown off daily at sea, and 12 inches at intermediate ports. The mean loss of weight in No. 2 set was 825.4 grains, as compared with 347.7 grains in No. 43 set, or nearly two and a half times as much. Boiler 62 was filled five times with fresh water, one inch of water being blown off daily. The plates were in the boiler for 298 days. The mean loss of weight was 364.9 grains, as compared with 825.4 grains in No. 2 set. Set 84 was in the boiler 43 days, the boiler being filled four times with sea water and once with fresh water, an average of 73 inches of water being blown off daily. The mean loss of weight was 575.7 grains, as against 364.9 grains in 62 set—being at the rate per month of 30 days, of 401.78 grains in 84 set, against 367 grains in 62 set. Comparing set No. 9, which was suspended in a jet condensing boiler, with 62, which was subjected to something like the most improved method of surface-condensing treatment, the loss in No. 9 was nearly four times that in No. 62 set.

These results clearly prove the error of the conclusion arrived at by many experienced persons previous to the appointment of the Boiler Committee. Experiments made by the author with plates similar to those mentioned, placed in sea-water, in rain-water, exposed to the weather only, and exposed to the weather and dipped in sea or rain-water daily gave a result of 64.8% in favor of the iron, omitting the hard steel. The corrosion was strikingly local and severe in the set placed in rain-water. Wetting the metals daily, especially with sea-water, and exposing them to the weather, caused very severe corrosion. The results of these experiments incontestably proved, that under almost all circumstances iron, and especially the harder sorts, was far superior to steel in the resistance it offered to corrosion.

**THE TAY BRIDGE.**—We (*Glasgow Herald*) understand that the plans for the construction of the new Tay bridge are now completed. The foundation piers, which are to be in pairs, are of immense size, and will be built of brick up to a height of 8½ ft. above high water, and on the top of these the supporting columns are to be placed. They will be octagonal in form, and of malleable iron, broad at the base, and narrowing at the top. A strong iron parapet will be erected on both sides of the bridge. At the south side the double line is to start at the same level as the present bridge, but it gradually falls by a gradient of 1 in 180 towards the north shore, which it will join on a level with the Esplanade. The spans over the navigable part of the river are to be 58 ft. 6 inches in height, and will be opposite the four southmost of the 12 wide spans of the present bridge, while opposite the center of the eight other spans a new pier is to be introduced. So far as the testing of the foundation piers of the present bridge has been effected, the results have been very satisfactory. The two piers which have been tested were each laden with 1,800 tons of metal, and under this enormous weight they were found to have scarcely yielded. The new bridge will be of immense strength, and quite adequate to resist the strongest gale which may come against it.

**PROJECTED RAILWAYS AND TELEGRAPHS IN CHINA.**—Intelligence from Peking states that Prince Li has advised the construction of a railway between Tientsin and Peking. Another line between Nienkin and Shanghai is projected and also telegraphic communication.

*Heraclitus's Journal* says: "There is no country in the world so favorable to railway construction as the Argentine Republic. It is as flat as a pancake and abounds in traffic. Capital cost is low, revenue receipts are high."

TEN Chinese engineers have arrived at Stettin, with a view of learning the art of building ironclads.

## USEFUL INFORMATION.

## A New Hydro-Carbon.

The new liquid hydro-carbon, to which reference was recently made in these columns, appears to be still attracting much attention in Europe. A French journal states that at a recent meeting of the Société d'Encouragement des Arts, etc., some remarkable experiments were made with this liquid, which boils at about 100° Fahr., and is said to burn with a brilliant white flame of a comparatively feeble temperature. On the occasion in question, a large can containing a supply of the liquid was set on fire by applying a light to its mouth, the spirit was then poured while flaming into lamps. The flame, spreading on all sides, simulated the beginning of a great conflagration, but was eventually extinguished by the lightest puff of wind. Any one in need of a light, but without a lamp for properly burning this liquid, may do so by dipping the corner of a pocket-handkerchief or the finger of a glove into it; and thus may be made a temporary torch, which when blown out will be found to leave the improvised wick without the slightest injury. Lamps intended to burn this spirit are constructed in such a manner that they are extinguished if thrown down. It is said to be extremely difficult to form an explosive mixture with the vapor of the new spirit and air, and that in any case the explosion cannot be made violent. The liquid has a slight and not disagreeable odor, and is not dear. It is sold at present at eight cents per pound, and its production is said to be unlimited. It has on other occasions been said to be a product of the Galician mineral hydro-carbone.

**AMMONIA FOR PREVENTING PETROLEUM FIRES.** M. Schlumberger has communicated a note to the Société Française d'Hygiène on the "Automatic Extinction of Petroleum Fires." Many accidents are caused, he says, chiefly by the igniting of the substance through imprudence. The druggist, for instance, in going into the cellar where the oil is kept does not always take proper precaution, and the result is that a disastrous explosion often takes place. He proposes a method of extinction in this and similar cases which he recommends shall be made compulsory under police regulations. His plan is to place on each barrel of petroleum a large bottle of liquid ammonia, so that, at the least explosion or on contact with the flames, the glass will be broken and the vapor of the liberated ammonia will form an automatic mode of extinction. The author states that he speaks from practical experience, and that he has frequently been indebted to ammonia for safety while conducting distillations of a dangerous character. He suggests that the plan should be extended to mining operations, and that easily broken vessels filled with ammonia should be stored wherever there may be a risk of accident from fire-damp explosions. Carbonic oxide cannot burn in an ammoniacal atmosphere.

**SHAFT COUPLINGS.**—There is an innate wickedness in the average shaft coupling; an inborn tendency to get loose, split, ring off, stick fast, etc. It is not reasonable for any one to expect that a line of shafting will keep in good order if hung to the bottom of a springy floor. The shafting should not be put up before the floor has received some, if not all, of its load, especially if there be heavy machines above it, which, will when put up, tend to sag the floor. Where the shafting is attached to cast iron columns supporting the floor, there is less trouble from sagging, either when the first load is put on the floor, or afterward when the building settles. The banger adds nothing to the torsional resistance of the shaft which it supports. The torsional strength depends upon the length and diameter of the shaft. Some recommend that flywheels be put on long lines of shafting, as tending, in a great measure, to equalize the strain of transmission.

A CURIOUS musical instrument called a color organ has been invented. When the various notes are sounded by touching the keys, different combinations of colors are reflected upon a ground glass plate, and these change and blend in a charming manner as a quick air is played. Thus two senses are gratified at once, and the beholder feels more than he understands the harmony between melody and color.

**THE LARGEST PYRAMID.**—We believe it is not generally known that the largest known pyramid rests on American soil. The Pyramid of Pueblo, in Mexico, is larger than the great Pyramid of Cheops, in Egypt. The latter covers only fourteen acres, while the Mexican one covers forty-four acres of ground, and was originally 600 feet high. It is made of sun-dried brick, and is supposed to have been built 7,000 years ago.

**A NOVEL METHOD OF RAPID LIGHTING.**—At the Royal Palace in Berlin, 40,000 wax candles are instantaneously lighted by a single match. The wicks are previously connected by a thread spun from gun cotton, on lighting one end of which all the candles are lighted simultaneously, and thus the whole of the 700 apartments are lighted at once.

**ACID PROOF CEMENT.**—Finely powdered glass, mixed with soluble silicate of soda will be found to answer this purpose.

**GERM FOOD AND ITS MANUFACTURE.**—An Eastern firm has lately introduced an article of diet called "Universal Food," which is thus described by the *Miller's Journal*: In the manufacture of this food, those portions which the miller is so anxious to exclude as coloring the flour, the germs, are made use of. The principle on which this food is based is the introduction of a natural chemical agent into the system, which has either not developed, as in the case of the infant, or which is lacking from such cases, as in disease. This chemical agent is diastase. Diastase is one of the chief ingredients in the pancreatic juices and saliva in the healthy adult. When from any cause the system becomes diseased, the percentage of animal diastase or ferment becomes less and less, until sometimes it is entirely absent. In children under one year of age it is found very sparingly. Starch, as starch, possesses no nutritive powers; it is only when converted into sugar and dextrine that it becomes of any value to the system. The province of diastase is that of a ferment. By its action starch is reduced into its component parts of dextrine and sugar; and if this fermenting agent be absent, the starch remains unchanged and useless. If therefore through disease or insufficient development this active principle of digestion is not secreted, the production and use of a food which shall fulfill this want is to be commended. The wheat germs are ground to a flour and made into a dough. This dough is cooked at a temperature of 150° F. for 30 hours in sealed boxes. This is re-ground and put upon the market in the form of a flour.

**A STATION INDICATOR.**—Many devices have been proposed for a practical railroad station indicator; but heretofore with very little success. Recently, however, a Hartford, Conn., inventor seems to have hit upon a device which is so promising of coming into general use that a company has been organized for its manufacture. It is described as follows: An ornamental box contains a roll of lettered canvas or other material, giving a list of the stations in their order, and over the opening where they are exhibited is printed "The next station is." By successively turning the roll of canvas the stations appear in due order, and at each change by a clever contrivance a shrill little whistle is blown for a moment, thus attracting the attention of all persons in the car. The whole thing is worked automatically by compressed air, and is all controlled by the engineer.

**IMPROVED EMERY WHEELS.**—An improvement in the manufacture of emery wheels consists in bedding within the wheel one or more disks of woven wire, which extend from the center nearly to the periphery.

## GOOD HEALTH.

## Healthy Women.

(Written for the PRESS by MRS. E. J. S.)

Woman's incapacity is the only real barrier to her progress. Whenever women will show themselves able, men will be compelled into willingness. They need, strength, caliber; they do not value enough muscular power. Aesthetic young ladies have imbibed and propagated the idea that feebleness and fragility are womanly and fascinating. The result is a legion of languid headaches, an interesting inability to walk half a dozen consecutive miles, a delicate horror of open windows, northwest winds and wholesome rain storms. There is no computing the amount of charming invalidism following in the wake of such a line as

"There's sweetness in woman's decay."

I do not refer to real invalids, who have inherited feeble constitutions, and by unavoidable and often unselfish and unceasing wear and tear, have exhausted their small capital, and to whom life has become one long scene of weariness and pain. Heaven help them bear the burden; and they do often bear it nobly, frequently accomplishing what ought to make their robust sisters blush for shame at their own inefficiency.

I mean women who have every opportunity to be healthy, but are not so, who are sick when they should be well. A woman of 20, in comfortable circumstances, ought to be as much ashamed of being dyspeptic as of being drunk. Fathers and mothers, hardened with cares and anxieties, may neglect physiological laws without impugning their character, but for a girl, carefree, to confess such an impeshment, is presumptive evidence of gluttony, laziness, or ignorance, and generally all three. I do not use elegant language I know; but let us call things by their right names, thinking we may better impress the indisputable fact, that a great majority of ailments arise from over-eating and under-exercising. The innumerable hosts of nervous diseases with which our women are afflicted are always aggravated, and often caused by these indulgences. Very few women know this, and if they did, it would be of little use so long as they considered illness one of the charms of beauty. If women could think that a good digestion is as excellent a thing for them to possess as for men we could soon make a change; and it seems to me a very queer taste to like sick and complaining women.

"I have finished my education" are words often said by young ladies fresh from boarding school; these restricted ideas of education have been so strongly impressed upon her mind that she feels content and satisfied to hang up her framed diplomas and use the smattering that superficial instruction affords her. We might as well expect to raise giant oaks or imperial cedars in flower pots as to expect noble lives with such stunted notions of education.

The public sentiment is grossly at fault on the subject of the physical education of females. In childhood girls should be as hardy and capable of enduring fatigue as boys, because nature has kindly endowed them with equal constitutional power to perform the duties of life; but when they are matured why are men healthier than women? Look at the families of merchants and business men. The men are active, industrious, accustomed to bodily exertion. Busy all day with sales and boxes, driving about the streets and wharves and looking after their affairs, their minds and bodies fully employed, they go home with a keen appetite; while their wives and daughters have dragged through the long day in listless idleness of sedentary pursuits, and they approach the table without an appetite, spurning the repast other hands have prepared, and, in answer to inquiries as to health, they fill the anxious husband's or father's ears with complaints of a thousand ills, to obviate which large doctors' bills and expensive trips to westerling places are incurred with no permanent benefit. Poor creatures, they have not been properly educated. The culture of the body has been neglected.

Women are as good as men—Nature has not said they are better—and they have a right to all the advantages which good health affords, and to all the means of obtaining it in a natural way. If work is the parent of health, let us not consign our girls to music, drawing and ornamental needle-work; let them harden their hands, brown their faces by sun and wind, no matter if fashion would toss its brainless head because they are not slim, pale, delicate, with soft white hands. Women do not lack reasoning power, and they can be developed as calm, earnest, common-sense companions, counselors and helpmeets for men; and who needs wisdom, judgment, reflection and a well-disciplined intellect, combined with strong affection and elegant refinement of taste and feeling, so much as she who is to mold the character of a family which is to control the church, the State and the business world of the next generation? Let them be taught chemistry, for they must compound the food of the world, and thereby obviate the necessity of the compounding of drugs at all. Let them study physiology, for they have charge of the clothing, feeding and health of the world.

Why should a woman be a life-time learning the laws that govern health, and only learn by sad experience how to conduct the physical and moral management of the young when she has grandchildren to exercise that knowledge upon? Knowledge is better late than never, but don't defer it until a generation of mental and physical constitutions are ruined, and half a generation are made tenants of short graves. Who more than a woman needs all the stores of solid learning and thought to manage a family and fill her station in life with wisdom and dignity? Give her a whole education and she will cease to be deemed a frivolous, fitful, useless butterfly. It is a wonder her education has not spoiled her. If she was not the better half of creation she could not have endured so much bad management, and still be worthy of adoration by the other half.

Within the last quarter of a century female education has received new attention and made vast progress, and we know that educated women will hereafter be companions for educated men and mothers of coming generations, and we await with patience the time when the errors of female education, as it relates to the body, will be corrected, and our women will have, as a rule, red cheeks, full chests, stout muscles, energy of action, fine health and a good appetite, and therefore never be the dependent, dissatisfied being we sometimes bear of now.

Calistoga, Napa Co., Cal.

**TREATMENT FOR A FELON.**—Take of soft lye soap and flaxseed-meal, or corn-meal, a sufficient quantity, stirring the meal in slowly and thoroughly, so as to form a salve or poultice. Envelope the finger in this, applying snugly, to bring it in close contact. Renew the poultice every 12 to 24 hours. Don't try every prescription you may hear of. Depend on this. It will, if applied in time, absorb the disease; if adopted later, it will bring it to a small "head" (if too far advanced to be "scattered") when it may be picked almost painlessly.—*Therapeutic Gazette.*

**THE LEMON VERBENA.**—The well-known lemon verbena is systematically gathered in Spain, where it is regarded as a fine stomachic and cordial, used in the form of a decoction. It is said that if it be used one need never suffer from flatulence, nervousness, diarrhoea or loss of appetite.

**ICE WATER AND BRIGHT'S DISEASE.**—The idea has recently been advanced that Bright's disease is attributed to the immoderate use of ice water. The fact is cited that the people of this country use 90% more ice in their drink than the people of any other country—Greenland not excepted.



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G. H. STROG.

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SAN FRANCISCO:

Saturday Morning, May 14, 1881

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## Passing Events.

The Wood River fever continues unabated. Various reports come from there. Those who have not found bonanzas the day of arrival write back that it is a dead failure. Those who have gone determined to work appear to be favorably impressed. The next few months will tell the tale better than we can tell it now.

One man says he would not advise anybody to come at present in the hope of getting work, but for prospectors the country is good and they cannot come too soon.

We hear of a good many strikes in California mines of late. That at the Rawhide, in Tuolumne county, is a very encouraging one.

The southern part of the State, particularly San Bernardino county, is coming to the front rapidly as a good mining country.

Another event of hardly less significance to the general prosperity, is that the Governor has given the Legislature notice that if they linger longer at the capital they must do it at their own and not at the public expense. The law makers were called together for certain necessary deeds, but quickly lost sight of them and fell into a maze of selfish interests and political plots that there seemed no certainty of anything except the *per diem* of members. In the rough old times the executive power would have driven the useless law makers from their seats. Modern constitutions and laws make such proceedings nowadays impossible, but there is still a way, and the Governor has found it. The vulnerable point is the pocket. The people should be thankful that there is this joint in the harness.

An old mining camp, with an abundance of rich gold ore, has been discovered in the Ticolina mountains, 15 miles from Las Vegas, N. M., at an altitude of 10,000 ft. Crude utensils for extracting and crushing the ore were found strewn about the place.

## Mining Partners and Re-locations.

The acting commissioner of the General Land Office has decided a question which is of very great importance to miners. He says, in effect that where a lode mining claim has been located by several persons jointly, and thereafter the required expenditures have not been made, the claim may be re-located by one of the former claimants to the exclusion of co-claimants.

Now this is a ruling which has a very important effect. It not only gives an honest miner a chance to rid himself of profitless associates, who won't come up with their share, but it also gives a chance for dishonest miners to get rid of partners, in ventures likely to be profitable, if said dishonest men are in charge of the property. People who have invested in claims with others, may as well look sharp personally, that this work is being done.

The question on which this ruling was made came up in the following form: "Can one of the locators of a mining claim, upon which the necessary amount of expenditures for a given year have not been made, re-locate the same as abandoned property, in his own name and for himself only?" The Acting Commissioner answers: "Section 2324, Revised Statutes, after prescribing this value of labor to be performed, or improvements to be made annually upon each claim, in order to protect the possessory right of locators, provides that 'upon a failure to comply with these conditions the claim or mine upon which such failure occurred shall be open to re-location in the same manner as if no location of the same had ever been made; provided that the original locators, their heirs, assigns or legal representatives, have not resumed work upon the claim after failure and before such location.'"

"From this it will be seen that the only question to be considered in the case stated is whether one of a number of original locators, whose claim has been abandoned, would stand upon the same footing as a stranger to the first location, who, by the provision above recited, is expressly authorized to re-locate such abandoned claim.

"It is clear that one of a number of locators of a certain claim can, concurrently with such joint location, locate a separate claim, independently of his co-locators; and as an abandoned claim reverts to the mass of unappropriated public lands, and becomes subject to a new appropriation, 'in the same manner as if no location of the same had ever been made,' I can see no valid objection to a new adverse location of such claim by one of the former locators."

At the same time, the commissioner decides that labor performed or improvements made by an original locator, cannot be claimed by him as part of the expenditures necessary to entitle him to a patent for re-location.

## A Drill Sharpener.

T. J. Williamson, of Carson, Nevada, has lately devised a simple instrument for sharpen-



Mining Drill Sharpener.

ing mining drills and cold chisels, which is represented by an engraving on this page.

The blocks that carry the dies *b*, are made of iron, and hinges together by a pin, so as to divide transversely on the line between dies, to permit insertion or removal of the drill. The steel dies are held in a dovetail mortise in the upper side of the blocks, so that each is held securely. The adjacent faces of the dies are formed with recesses of a shape corresponding to the drill-points. There are three of the recesses in the dies, adapted for drills of differing sizes, so that either one of the recesses or openings may be used, according to the size of drill that is to be sharpened.

The instrument is to be used in the following described manner: The drill to be sharpened is first heated, and then the end, or point, placed between the dies *b* in the recess that corresponds to the diameter of the drill, and the blocks and dies closed upon the drill point; then, by striking a few blows with a hammer on the drill head, the point is spread and caused to take the shape of the recess and the edge sharpened.

The drill is thereby brought to the uniform size, and the angles that may be broken filled out. The drill is then removed by opening the block and dies, and hardened by plunging it in water.

This device is simple, and requires no special skill for its use. It is adapted for use at the place where a well is being drilled or holes drilled for blasting, and by the men using the tools.

By its use the drills, and consequently the drilled hole, can be kept of uniform size. Miners generally use three sizes of drills, and the instrument is constructed so that it is adapted for the three sizes used.

## Artesian Water in Oakland.

The operation of boring an artesian well is a very simple one, requiring no very complicated apparatus or expensive machinery. Yet skill is required in handling the rods and tubes, the drills and augers, and in using the proper appliances at the proper time. Sinking a shaft is an easy thing to do, but it takes a miner to do it well. So with the artesian well, any one can do it, but the man with experience can do it best.

In previous numbers of the PRESS we have given the *modus operandi* of artesian well-boring, with illustrations of the various devices used. And we have also given engravings showing the location of the wells in San Francisco, and diagrams showing the position of the water-bearing strata, from the Sierra across the Sacramento valley, under the bay, and in this city. In the present case, therefore, we shall confine our remarks to the question of artesian wells in our sister city of Oakland, where there are many.

Oakland being a large city as to area, its population being spread over a very wide tract, and all the homes having more or less ground around them, requiring more or less water, the question of water supply has been a serious one. It is pretty well conceded that the city should supply itself with water. It is the opinion of 99 citizens out of 100 that if the city had provided its own water and gas, economically, at an early day, the population would now be from 50,000 to 60,000 instead of 38,000. More cheap homes would have been built, and more manufacturing enterprises established. The citizens now want cheap water, cheap gas, cheap fuel and good wagon roads, the narrow gauge railroad tunneled through to Contra Costa county to bring in cheap produce, when Oakland will rapidly expand. The narrow gauge railroad will be a good promoter in this direction.

Now, Oaklanders cannot have all these advantages at once, but they will soon have the new railroad and they now have cheap artesian water. This is a fixed fact. The artesian water of Oakland is generally of superior quality. On the block in which the writer lives is an artesian well 84 ft. deep, and the water rises from the bottom stratum of this to within two or three feet of the surface. This water is pure, clear and sparkling, and is, moreover, very cold and palatable. This is the case with all the artesian water. There is no smell of frog-pond about it. In the filters in Oakland houses there are now bodies of loathsome worms, leeches, hogs, etc., horrible to the sight, to say nothing of the taste. And yet these things are not so nauseating as the remembrance of at least a few citizens who, not many years ago, used to see the pulpy refuse of 30 to 50 cows wheelbarrowed down to the creek in the dry season from a dairy yard and dumped in a location from which it was sure to be carried by the winter rise in the stream directly into the reservoir that still supplies a large part of Oakland with water.

We are glad to say in the cause of humanity, however, that that practice has been discontinued for years.

People who have modest homes and medium-sized families are generally required to pay as much, or more, in Oakland for water than for either the items of bread or of milk. In fact, nearly all of the citizens of that town feel as if they were robbed every time they have to pay this extraordinary monthly water rent.

In the first place, you have to pay for your water before you get it. In the next place, when you do pay for it, you get something of a very poor quality. The water people argue that the water is free; they charge nothing for the water. But they charge for delivering the water. And they don't deduct anything in winter, when they bring you almost as much mud as water, and in the fall, a very undesirable proportion of vegetable matter.

In one way, however, the Oakland people can get ahead of the water company, and that is by getting artesian water, a less costly operation generally than in San Francisco. To learn the capacity and cost and location of a number of these wells, we interviewed Mr. W. G. Spence of 604 14th street, who during the past few years has bored the following wells, and who gives us particulars from memory.

We give the approximate capacity, but in a number of instances it is doubtless understated.

No. 1 is a well of 12-inch bore, corner of Kirkham and 5th street. It has a capacity of 10,000 gallons per hour, is 180 ft. deep and was made on a contract for which the railroad paid \$1000.

No. 2 is on the northwest corner of Kirkham and 5th street. It has a 10-inch bore, is 185 ft. deep and furnishes 6000 gallons per hour. It cost \$600.

No. 3 is a 12-inch bore, corner Pine and Taylor, 130 ft. deep; furnishes 8,000 gallons per hour; cost \$550.

No. 4 is a 7-inch bore, and is on the corner of Wood and Taylor Sts. It gives 2,000 gallons per hour; is 128 ft. deep; cost \$200.

No. 5 is on the corner of 11th and West 5th; is a 7-inch bore, 260 ft. deep; cost \$650, and yields 3,000 gallons an hour.

No. 6 is on the corner of Castro and 10th. It is a 7-inch bore, 330 ft. deep; cost \$700, and gives 3,500 gallons an hour.

No. 7, on the corner of 7th and West, is a 7-inch bore, 400 ft. deep, costing \$800; yields 3,000 gallons an hour.

No. 8 is a 12-inch bore, corner of Adeline and 5th street, 185 ft. deep, yielding 10,000 gallons an hour, and costing \$800.

No. 9 is on 2d, near Clay. It is 12 inches in diameter, 285 ft. deep, yields 10,000 gallons an hour, and cost \$900.

No. 10, on First St., near Jefferson, is a 12-inch bore, 240 ft. deep; capacity, 10,000 gallons per hour; cost \$800.

No. 11 is on the corner of 20th and Market. It is a 7-inch bore, 160 ft. deep; capacity 7,000 gallons, cost \$370.

No. 12 is on Telegraph Avenue and Durant St., is 11-inch bore, 70 ft. deep; yields 3,000 gallons, and cost \$265.

No. 13 is on 10th and Clay Sts.; is a 7-inch well, 90 ft. deep; yields 2,500 gallons an hour, and cost \$120.

These statements of the different wells of varied depths at several parts of the city will show the yield and cost. This list embraces the largest wells in Oakland proper, but only about a twentieth of the number. In many so-called surface wells, generally four or six inches in diameter, good water is obtained in from 40 to 60 ft. Some of these have a capacity of from 1,500 to 2,000 gallons per hour. The water usually rises to within 7 to 14 ft. of the surface. The water is usually cold, but in some deep wells is moderately warm.

In Oakland the usual, in digging wells, find a sand stratum from 40 to 50 ft., then clay stratum from 20 to 100 ft., then the water is usually struck on gravel or coarse sand. Sometimes a cement or concrete of gravel and clay is found—a blue deposit, somewhat moist, like the dark mud of this bay, compressed to the consistency of cheese, and underneath this, a stratum of clam or oyster shell debris; under this shell debris, there is always a seam of water, and then always clay.

The water stratum seems to exist on undulating strata of sand or gravel, at the highest points seeming to exist in sand, at the lowest in gravel. It is seldom that any considerable obstructions are met with in boring, although redwood logs have been encountered in several instances at the depth of about 84 ft.

There appears to be an inexhaustible supply of good water, and our informant, Mr. Spence, and other practical men, have no doubt that a city of more than three times Oakland's present population (of 38,000) can be constantly and abundantly supplied, and that at moderate cost.

We recommend the city council of Oakland to appoint a committee to investigate and report on the best and most feasible plan for the city government to supply the citizens with water for domestic use, and for protection from fires. Had Oakland provided and furnished both water and gas for its citizens for a trifle over cost during the first five years, its population would now be 60,000. It would be more of an inducement to new settlers than many imagine who have not thought of the subject. The subject of good water in our cities is of more than local importance, as people all over the State look to the centers of population as points most suitable for the education of their children. Of course they prefer, other things being equal, to find a place where water, the great necessary of life, is abundant and pure. We shall be pleased from time to time to receive further information from Mr. Spence, and other practical well-borers, concerning the progress of well-boring in Oakland, and in other parts of the State, as we propose to give continued attention to this all-important subject.

JUSTICE.—At the meeting of the Justice Mining Co. held last week, the following directors were elected. Washington Ayre, H. M. Levy, Gustave Frank, J. P. Cavallier, John Scott Wilson. At a subsequent meeting J. P. Cavallier was elected President, R. E. Kelley, Secretary, and Matt. Canavan, Superintendent. The receipts for the year were \$137,276, of which about \$125,000 was from assessments. The pay roll for the year, was \$16,348. The expenses charged to "legal" were \$53,793. When it takes over \$50,000 to pay the lawyers during the same time it takes only \$16,000 to pay the miners, the mine had better be stopped as a mine, and the attention of the stockholders turned to something else. "Justice" ought to be satisfied when that much money is spent in one year for lawyers. No wonder there was an opposition ticket in the field.

MINING COMPANIES' BOOKS.—At a meeting of the stockholders of the Mt. Potosi Mining Co., a new Board of Directors was elected as follows: J. M. Day, M. R. Levenson, H. Lowden, N. D. Thayer and J. N. Fish. The new Board organized by electing M. R. Levenson President, and he demanded of R. A. Holmes the books of the company, which the latter refused to give up. He warned Holmes that he was liable to criminal proceedings for refusing, and again demanded, as a stockholder, to see the books of the company, and the latter refused to give them up. H. Lowden called the Secretary's attention to the law requiring such books to be open for inspection by stockholders on demand, during business hours. Holmes said it was after business hours, and refused to show the books. Thereupon Holmes, on motion, was dismissed as Secretary, and J. H. Sayre was chosen by the new Board of Directors. The old officers claim that they are still in power.



## High Explosives.

[Written expressly for the Mining and Scientific Press,  
by M. EISELER.]  
Number Six.

## Compressed Gun Cotton.

Through the systematic study of Abel, an eminent chemist, this material has now attained quite a position in England, as by means of his analytical and synthetical researches he has found the causes of the instability observed in that substance, and has traced its occasional liability to undergo spontaneous combustion to the presence of minute quantities of foreign substances of comparatively unstable character, produced by the action of nitric acid upon resinous or fatty substances retained by the cotton fibers.

Some parts of his mode of manufacture may be considered comparatively safe, as he carries it on with the material in a wet, therefore unflammable state. His mode of converting it into a minute state of division is the main improvement which he introduced, as it allows of a more perfect cleansing, and then its conversion into highly compressed masses are the main features of his mechanical modifications; otherwise, he admits: One has only to follow Von Leuk's plan, and adhere to his rules.

## Manufacture.

The process of manufacture as pursued by Prentice & Co., or the Liverpool Cotton Co., is as follows:

Clean cotton waste, picked as free as possible from foreign matter, is brought into a uniform and open condition, by being passed through a carding engine.

The rolls thus obtained are dried in a triple cylinder, by means of a steam jacket.

When completely dried it is placed in large tins and carefully covered.

After standing in these till quite cold, the cotton is weighed out in quantities of 1 lb. each, and carried by a boy to the dipping vessel. Here each pan is charged with about 12 gallons of a mixture of 3 volumes of sulphuric acid, 1.84 specific gravity, and one volume of the strongest nitric acid, the whole being kept cool during the action by currents of cold water, which circulate around the vessel.

In this mixture the cotton is dipped, and after it has been in about three minutes the workman lifts it onto a grating, just above the acids. Then, with a movable lever, he gently squeezes it until, roughly speaking, it retains about ten times its weight of the liquid.

Thus saturated with the acids, it is allowed to remain in well-covered earthenware pots for 24 hours, the pots during this time standing in a shallow trough containing water, to keep down the temperature, sufficient acid being added to cover the cotton. The chemical change in the cotton is now complete, and the further processes are for washing and pressing.

First, the large excess of acid is driven off by a centrifugal machine, and the waste acid is caught by a jacket surrounding the revolving portion of the machine, and collected in a receiver. These machines are on the principle of the wringing machines employed by laundries to dry clothes (whizzer).

On leaving the centrifugal machine the gun cotton has to be washed. This operation also requires great care, because the acids which the gun cotton yet retains would give rise to a considerable development of heat, if mixed slowly with water. At such an increased temperature the gun cotton would be decomposed, or "fired," as it is technically called. Therefore it has to be brought at once in contact with a large body of water.

To perfect the washing, the cotton is subjected to the action of water for one, two or three weeks, and afterwards boiled in large vats by the injection of steam. By this latter operation the less stable compounds are destroyed and extracted and the purified gun cotton is transferred to the heating tanks.

This is a simple contrivance for converting the gun cotton into pulp. It is a machine similar to the one used in paper mills and called Hollander.

The pulp is now removed from the tank to a poacher, where it is agitated with a large quantity of water by a wheel, and here it has to be washed till it answers the heat test, which the chemist now applies.

When his report is favorable, the pulp is transferred to a vat and mixed with a small quantity of caustic soda.

The further processes of abstracting the water and moulding the pulp into cartridges or other shapes, is performed by hydraulic pressure or other pressing machines, which are very ingeniously arranged, and great credit is due to the manufacturers for the nice and elaborate machinery they have adopted for the treatment of their products.

Where the cartridges are made under light pressure they are put on perforated trays, and dried in chambers heated with hot air.

In establishments where the gun cotton is mixed with oxidizing salts, these are mixed in regular gun-powder incorporating mills, of light but very elegant pattern.

The great difference between the process of manufacture described above, and that of Von Lenk, consists in the introduction of the pulping operation devised by Abel. This improvement admits of very searching purification, and

also of more reliable testing, and of the subsequent compression.

## Properties.

Before it has been reduced to pulp, gun cotton has the same appearance as the original fiber, but it is harder to the touch; it has neither taste nor smell.

It is insoluble in water, ether or alcohol. Dilute acids and alkalis have no action upon it, but a lower substitution product is formed by the action of nitric acid of the specific gravity, 1.45.

Strong sulphuric acid dissolves it with difficulty.

Caustic potash dissolves it.

Much uncertainty prevailed for a long time as to whether gun cotton was liable to spontaneous combustion or not. As I have shown in my former articles, it had been used in Austria for 12 years, where it underwent the severest tests, and was held by the best authorities to be perfectly safe, but it was at last rejected on account of its instability, and also that other governments abandoned it after experimenting with it extensively. Prof. Abel, in his valuable researches, ascribes the reason of its decomposition to be mainly due to impurity, generally resulting in the process of manufacture, from the action of the acids on resinous matter in the imperfectly washed cotton, and certainly the experience of the last few years speaks in favor of his theory, as no accidents from that score are on hand.

It is only in late years that the true cause of chemical instability, which belongs to the whole class of nitrated organic compounds, has been clearly defined, it being the life question of our modern high explosives.

After their nitration a certain portion of acid—sulphuric, nitric and hypo-nitric—always adheres to those compounds, more or less, according to their form and structure. From a liquid explosive substance like nitro-glycerine, the acids are easily washed out by churning it with water first and then with alkaline solution. But

The large amount of carbonic oxide is very deleterious and even dangerous when pure gun cotton is exploded in a close place.

It is very clear to my mind why English manufacturers have adopted the admixture of oxidizing salts (saltpetre, nitrate of baryta) with gun cotton, as the oxygen contained in the salts effects a more complete combustion, rendering the resulting gases less obnoxious than those resulting from pure gun cotton.

## Gun Cotton in Mining Operations.

In the compressed form, gun cotton is susceptible, like nitro-glycerine and its preparations, of explosion through the agency of an initiative detonation (cap). Compressed gun cotton may therefore be applied with the same facility as dynamite and analogous substances in all mining and blasting work. On a whole the mixture of gun cotton and salts are not as sensitive to concussion as dynamite, consequently an extra strong cap is required to detonate it. As the highest nitrated product of cellulose (trinitro) still demands 24.24 parts of oxygen for the conversion into carbonic acid of the carbon in 100 parts, it is evident that the most explosive gun cotton producible must be inferior in explosive power to nitro-glycerine, which contains a very slight excess of oxygen. Some authorities claim that in spite of its high state of compression to which English manufacturers have brought it, that its strength is much less than dynamite.

Here, also, it is clear why the English manufacturers have adopted the use of an admixture of oxidizing salts, as stated before; but the question will present itself: Is not the quickness of the explosion less rapid through this admixture than of pure cotton?

Where great local action is required, nitro-glycerine or dynamite compete advantageously with those substances. Some careful comparative experiments made by the German engineer corps, at Graudentz, with Nobel's dynamite and Abel's compressed gun cotton (made at the English government works), demonstrated that dy-

needs no thawing out, which is appreciated in cold climates. It does not suffer from exudation, and when properly made has good keeping qualities.

One great advantage again of nitro-glycerine and its preparations is, that they remain unaltered under water and can be used in wet, holes with the same facility as in dry holes, and although compressed gun cotton when containing 10% or 15% of water can be exploded, it requires a very strong exploder or a dry primer to accomplish it, consequently for work under water dynamite is preferred.

The cost of these two materials also differs greatly; the expense of producing gun cotton must be 20% or 25% higher than dynamite; therefore, when the question of competition arises, the latter has the advantage.

To the last six or seven years there have been brought forward in England (since Abel perfected his system of reducing gun cotton to a fine state of division and compressing it) several special preparations of gun cotton, for which peculiar merits are claimed by their advocates. One of those preparations, manufactured by the Gun Cotton Co., is a mixture of finely divided gun cotton and saltpetre. Another, the Tonite Co., at Faversham, mixes gun cotton with nitrate of baryta. Which of these is the best, practical experience alone can form the estimate.

## The Walrus.

Eminent naturalists have remarked that the walrus, or sea-horse, appears to be the connecting link between the mammals of the land and those of the water. This bulky and unwieldy animal when on shore has some resemblance to the seal, yet differs materially in its proportions, as well as in its elephant-like tusks. The walrus attains the size of the largest sea-lion, and measures from 10 to 14 ft. in length, and about 8 ft. in circumference. Its head is rounded,

small (when compared with the anterior portion of the body), and flattened in front. Its eyes are diminutive in size, and deeply set; the small orifices of the ears are about 3 inches behind, and 2 inches below the eyes. The cheeks are studded with 400 or 500 spines or whiskers, some of which are rudimentary, while others grow to the length of 3 or 4 inches. They are transparent, curved, abruptly pointed; and about the size of a straw, but not twisted, as has been stated by some writers. Its neck is short, and its unwieldy body is largest about the chest. Its posterior is abrupt.

The tusks of the walrus are not only a means of defence, but are used in obtaining food, and in mounting the ice-floes, when the shore is not accessible. The canine teeth, as they are sometimes called, may average 2 ft. in length, including the root, which is imbedded in the jaw 6 or 8 inches. Yet some individuals have been taken with tusks 2½ to 3 ft. in length, and each weighing from 10 to 20 lbs. In shape they are somewhat bowing, and slightly hollowed, notched and ridged at their bases. At their junction with the skull, they are about 3 inches asunder; they project at an obtuse angle from the

upper jaw, and, in some instances, meet at their extremities; while others grow perpendicular to each other, or turn outward on each side. There is considerable diversity in their length, shape and size, even in the full-grown tusks, some being very short and stout, while others are elongated and slender. The walrus has no sharp incisors like the seal. The nostrils are placed on the superior portion of the snout, through which the animal appears to inspire, and expires through its mouth, as it dips its head below the surface, blowing up the water into spray, in such a manner as to resemble the spout of a whale. The skin of the animal is thick and somewhat spongy, but exceedingly tough. The hair that covers it in most adult individuals is short and of a dark brown; yet there is no lack of examples where it is of a much lighter shade, or a light but dingy gray. Unlike others of the seal tribe, the animal is abundantly infested with vermin. Under the skin lies the coating of fat which yields oil—it is from 2 to 3 inches in thickness. The appearance of the fully developed walrus in the water, with its long tusks, which seem like an incumbrance, has a striking contrast with that of the common seal. The young, however, before its cumbersome canines protrude, resembles the latter in general form, but is of a black color. On land the walrus is comparatively inactive and clumsy in its movements; but in the water its motions are easy and vigorous. Its geographical distribution quite encircles the globe in that colder belt of the northern hemisphere, above the latitude of 45°, and but few individuals are met with south of 47° north. In Behring sea they are found as far south as the shores of the peninsula of Alaska, and in the Pacific ocean about several of the islands which fringe the central coast of Alaska Territory. They feed upon shell-fish and other submerged marine productions. The walrus is gregarious, being sometimes found in herds upon the ice, and at the proper season the animals collect upon the beaches, or they clamor upon rocky islets in remote places. These interesting facts, as well as the engraving, we take from Capt. Scammon's elegant work on the "Marine Mammalia."

The Piutes are leaving the Comstock for Walker river, Humboldt, etc., being afraid to stay among the whites any longer on account of so much small-pox being in Gold Hill,



THE WALRUS—(Rasmarus Obseue)—DRAWN BY H. W. ELLIOTT.

a granular, flocky or fibrous material, like cotton, retains the acid with far greater tenacity, particularly the nitrous and hypo-nitric acids, which every nitrated organic compound has a strong tendency to retain.

It is quite clear that if there is hypo-nitric acid present, that highly corrosive material, which attacks almost every organic compound, even at the ordinary temperature, must be removed; if not, it will slowly, but surely, lead to an incipient decomposition, which, acting on a nitrated substance, sets free portions of dioxide of nitrogen or hypo-nitric acid.

From nitro-glycerine the corrosive acid is washed out with the utmost facility, and from the moment when the importance of that operation became fully appreciated it has never been neglected. Hence the chemical stability exhibited by dynamite under all conditions of climate.

Although nitro-glycerine has exhibited, upon the whole, greater chemical stability than gun cotton, yet it acquires that superiority only after being thoroughly purified from acid at the factory. When it contains free hypo-nitric acid it cannot be stored at all in hot weather, and even during the course of its manufacture it has several times given rise to a decomposition, ending with explosion and loss of life. The instability of the crude article contrasts so strongly with the stability of the pure nitro-glycerine in dynamite as to remove every trace of doubt regarding the decomposing influences of the adhering acids.

## Fumes.

Amongst the most grievous complaints of miners about modern explosives, is the poisonous nature of the fumes emitted, which exposes them to most serious inconveniences.

The gaseous products of the explosion of gun cotton differ from those of nitro-glycerine, as gun cotton lacks 24.24 parts of oxygen in 100 for the complete conversion of its carbon into carbonic acid, consequently we have the following to be the percentage composition of the resulting gases:

Carbonic oxide.....	23.55
Carbonic acid.....	19.11
Marsh gas.....	11.17
Nitric oxide.....	8.83
Nitrogen.....	8.86
Aqueous vapors.....	21.93
	98.15

namite produced somewhat greater local or shattering effects than gun cotton.

The plastic condition of dynamite and similar preparations gives them an advantage over the rigid, compressed gun cotton in blasting operations, as plastic powders may be inserted more readily into rugged and uneven bore-holes, and may be made, by application of pressure, thoroughly to fill the part charged. Every miner is aware of the importance of having his charge well home in the bottom of his hole, filling the whole cavity. And this can only be accomplished with a plastic powder.

The increased effect derived from this mode of applying plastic explosives is far greater than is generally believed.

Volume for volume, it is impossible to put the same weight in a bore-hole for a certain given space; or, in other words, if one has a cartridge of dynamite, say one inch diameter and four inches long, and one of compressed gun cotton of the same size, the dynamite cartridge will weigh more; consequently one has more explosive material in the same space, owing to the higher specific gravity of dynamite, and as a consequence larger bore-holes are required when using gun cotton, which increases the cost of mining.

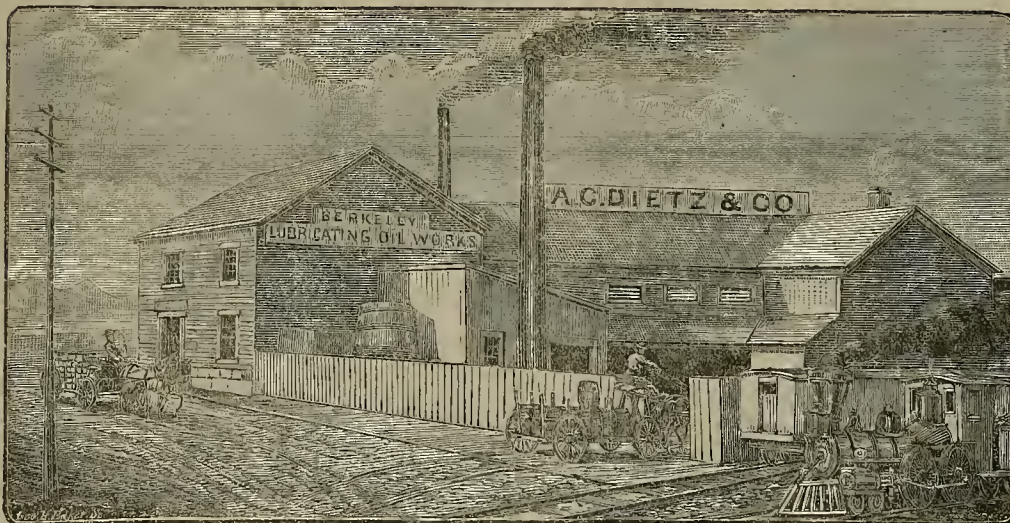
The cartridges of compressed gun cotton are rigid, stiff, and every miner knows there should be no air-chamber round the charge, for the expansion which it causes not only lessens the power in proportion to its dilution, but actually decreases the tension of the gas in a much greater measure. Stiff cartridges cannot be introduced into a bore-hole without leaving a considerable air chamber round the charge, particularly as bore-holes generally deviate a great deal from the circular shape.

It is difficult to calculate even approximately the relative proportions of the unoccupied space and the charge, but certainly the loss will amount to considerable. When a loose mass of gun cotton is ignited in the air it burns rapidly away without any explosive effect. But if the ignition takes place in a closed chamber, the gaseous first produced immediately penetrate the mass of the cotton, and the whole is instantaneously decomposed. According to some authorities, gun cotton will not explode below a temperature of 280° F.

Gun cotton has the great advantage over dynamite that it does not freeze, and therefore



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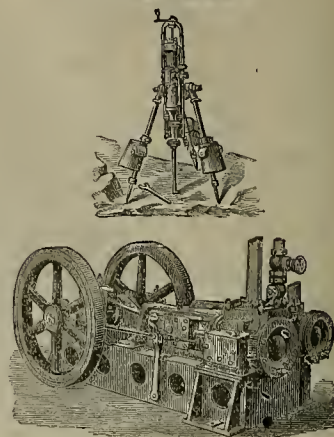
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Believing that a journal of its kind is a necessity on this coast, and judging from what has appeared in the "Quarterly Architectural Review," we are led to believe that the CALIFORNIA ARCHITECT AND BUILDING REVIEW will be worthy of generous support and encouragement. We therefore pledge our cordial sympathies, personally, and hope that the enterprise will receive kindly recognition and liberal support from all Architects and Builders and the public generally. (Signed) David Farquharson, Wright & Sanders, S. H. Williams, Thos. J. Welsh, P. Huerta, John Marquis, B. McDougal & Son, Wm. Mooser, Wm. Curlett, Meeker & Banks, W. C. Hoagland, S. & J. Newsom, B. Henrickson

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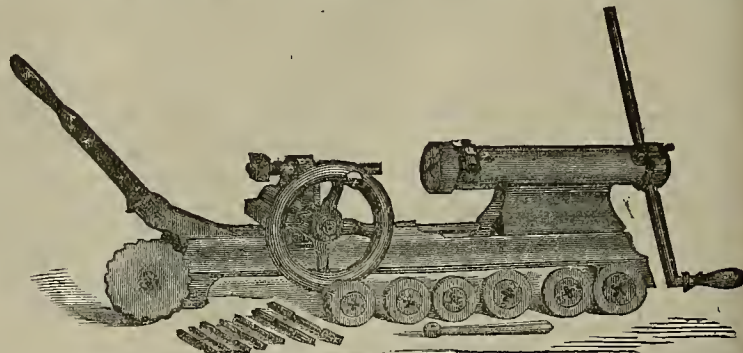
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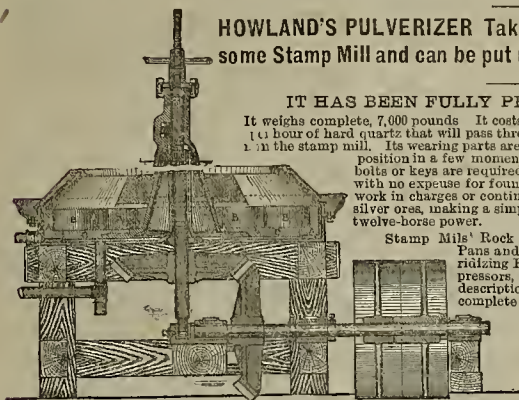
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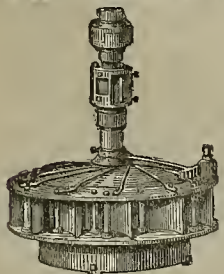
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING APRIL 26, 1881.

240,572.—PADLOCK.—P. H. Baker, S. F.  
240,555.—CLEANING SEWERS.—P. Burke, Virginia City, Nev.  
240,597.—PRODUCING ARTIFICIAL COLD.—J. F. Gesner, San Rafael, Cal.  
240,723.—SPREADER.—W. F. Jeans, Woodland, Cal.  
240,752.—GUIDE FOR PENMAN.—E. Numan, S. F.  
240,756.—VALVE MOTION.—E. O'Neill, S. F.  
240,558.—PLOW.—E. Squires, Beaverton, Or.  
240,567.—GATE.—J. and A. Wright, Rohnerville, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**BEDS.**—Frederick Roehner, Oakland, Alameda county, Cal. Dated May 3, 1881. No. 241,071. This invention is an improvement in beds consisting in the combination of a peculiarly constructed mattress and a roller journaled at the head of the bedstead upon which the mattress is fitted, and by means of which it can be easily moved. The idea is to provide a means by which a heavy top mattress can be readily changed to render every part serviceable. The ordinary mattresses are heavy and unweildy. Considerable exertion is required to turn them over when necessary. It is also evident that the number of different changes is limited, or that when the mattress is used in one position and becomes pressed down and hardened in the place where the weight of the body rests, it can only be changed by turning the mattress over. Thus only a portion of the mattress is brought into use, by being subject to such few changes. The hair or other filling of the mattress becomes hardened in certain places, and long before it is worn out becomes uncomfortable and practically useless. Its great weight makes it a task to turn it. One would therefore be less inclined to perform this operation often. To provide a mattress equally good, but with less weight and one capable of being changed and turned to more advantage by bringing more of itself into use, has been the endeavor of upholsterers. One method is to make the mattress in two or three pieces. For double beds the mattress is cut so as to leave the larger section square. The smaller section is put at the head. The weight of the body will press upon the larger piece toward its outer boundary. It is manifest that being square, it can be moved in four changes on one side and four on the other, and being lighter than a mattress, is easily changed; but while this answers for double beds, it cannot be used upon three-quarter or single beds, because these latter sizes, while retaining their length, narrow their width, and it is consequently impossible to form a square section out of the mattress without bringing the line of separation down in a place too low for comfort and use. The only method which can be used for beds smaller than the double bed, is to form the mattress in three pieces. This is, however, objectionable as being troublesome. This account of the state of the art will show why Mr. Roehner made his invention. He makes the top mattress in the shape of a band or ring, the thickness of both sides being equal to that of an ordinary mattress. A roller passes through the mattress at its head. To move it the person stands at the foot of the bed and catches hold of the mattress by its lower part, and pulls it so as to turn it on the roller. In this way every portion of the mattress can be used.

**CABLE-TRAMWAY FOR CARRYING CARS AROUND CURVES.**—Sehra R. Mathewson, San Francisco, Dated May 3, 1881. No. 241,044. This is a system for cable roads to enable the cars to pass around curves. It consists in arranging a series of upright rollers, and intermediate plates within the tunnel or tube within which the cable runs, the said rollers and intermediate plates forming a practically continuous surface, over which the cable and grip pass whereby the grip may pass around curves and corners of streets and the grip be carried smoothly around said curves. It further consists in the peculiar construction of the vertical and horizontal or guide rollers whereby friction is reduced. The difficulty heretofore has been, in constructing cable roads which will permit cars to pass around curves, in the fact that the grip cannot, by reason of the strain of the cable, pass over the space between the rollers. The difficulty of providing rollers having such little friction as to permit a cable to pass around a curve, has prevented any attempt to make a grip pass around also, because of the manifest increase of friction. The grip not being pliable like the cable, cannot conform itself to the curve, and will not follow the cable sufficiently to prevent it from either striking against each roller on a curve and jarring the

car, or passing it with such friction as to render the attempt practically futile. In this invention rollers are provided which will reduce the friction to a minimum, and by reason of the intermediate plate the grip can be conducted from one roller to the other without jar and with little friction, thus rendering the passage of the grip around the curve possible.

**ANIMAL SHEARS.**—John J. Bogard, Dated May 3, 1881. No. 240,953. This invention relates to certain improvements in that class of sheep shears which are constructed of several parts, the object of which is to render the blades detachable. It consists in providing each of the blades with an extended shank, by which they are attached by a peculiar joint to the arms or handles of the spring bow. The object of the inventor is to make a joint securing the blades to the handles, which, while permitting them to be easily detached therefrom, where necessary, will be firm in itself, are so constructed that natural wear will, on the contrary, make it as tight and firm when in use as at first.

### Expenditures on Claims.

**EDITORS PRESS.**—Permit me to say that I consider the recent ruling of the Commissioner of the Land Office in the case of the Boh Ingersoll mine, referred to in your last issue, to be in conflict with common sense and constitutional law. It has heretofore been the custom of the Commissioner to construe the laws relating to matters in his department in accordance with justice and reason; but now he decides that a claim is forfeited because a certain work was not performed in the calendar year 1879, when no law was in existence requiring its performance.

At the time of the passage of the amendment of January, 1880, the Boh Ingersoll claim was a valid claim, since the requirements of the act of 1872 had been complied with, and it is absurd to suppose that Congress intended, even if it had the power, which it has not, to make a retroactive law by which that validity should be impaired.

It is true that, under the former law, the Boh Ingersoll would have been forfeited by failure to perform on it a second \$100 worth of work prior to September, 1880, but that law was superseded by the amendment of 1880, and, under a just and constitutional construction of that amendment, all claims which were in good legal standing at the date of its passage, became liable to its operation from the date of that passage, without prejudice to their prior validity. Practically they were, for the purpose of that amendment, in the same position as claims located subsequently to January, 1879, on which no work need be done until any time in 1880.

The absurdity of the position taken by the Land Office consists in the fact that it is manifestly impossible to do work in 1879, or any preceding year, after January 22, 1880, and in holding a person accountable for not having done, in the past, that which he was not required to do by any then existing law.

Aside from the fact that the construction put upon the amendment of 1880 is in apparent conflict with the Constitution of the United States, it is doubtful if it could be sustained by the literal meaning of the language employed. "Shall apply" seems to refer to the future and not to the past; that is, to the conditions of tenure after the passage of the amendment, since an amendment to a law is not usually held to effect the operation of the law previous to the adoption of the amendment.

Had a retrospective operation been intended, it would have been easy and proper to say so, as "this section shall apply retrospectively, etc." If the "present rulings" are to remain in force, or to constitute a precedent for the future, it will not be safe for a miner to absent himself for a moment from his unpatented claim, lest intelligence of some new "retroactive" law be flashed across the continent for the benefit of professional "jumpers." If one could only have foreseen that decision, how easy it would have been to make a fortune—that is, supposing one's brains were not blown out in the attempt.

It does not, however, appear to be necessary for claimants of mines to re-locate their properties, although it might in some cases be convenient to do so. In case of a defective record—in the light (?) of the new decision—it is only necessary to begin immediately to do the \$100 worth of work required for the current calendar year before a re-location can be made by "jumpers," and, under the provisions of the act of 1872, a claim, although forfeited, will thus be restored to validity. It is a pity that the Boh Ingersoll case did not reach the courts, as the decision of the Land Office would almost certainly have been reversed.

The only essential points in which the operation of the new law differs from that of the old are, that under it a locator may, in some cases, have nearly two years, after making a location, in which to perform his first installment of work, and that it settles the disputed question as to applying the excess of work over \$100, done in any one year, to the credit of succeeding years. Doubtless the latter was the object of the framers of the amendment. Under either law it is possible to allow nearly two years to elapse between any two, though not between every two installments of assessment work.

C. H. A.

The Silver Reef striking miners are still in jail.

### The Madera-Mariposa Route to the Yosemite.

Each year something has been done to facilitate access to the Yosemite, and the improvements in this direction are not yet ended. The latest, however, and one which merits especial mention at this time is the improved Madera-Mariposa route, which supersedes the old Mariposa route.

Madera is a town in Fresno county and a station upon the Southern Pacific railway, 135 miles from San Francisco. We shall give some notes of its growth and industries in another column. It has come into especial fame now as one of the points where tourists coming into the State, either by the northern or southern routes, may disembark to reach the Yosemite valley. A new line of splendidly built, strong and safe stages has been put on by the Yosemite Stage and Turnpike Co. The manager of the line is A. H. Washburn, who has been a leader in facilitating Yosemite travel from the early days of trail routes. In company with others he built the old route via Merced and the present Madera-Mariposa route at a cost of over \$60,000. His long experience is of no small value to the public in the way of securing the safety and comfort of his patrons. Mr. Washburn has fitted up the route this year with special cars, and is justly proud of the score of fine, fleet horses which are in the stables of the company. The coaches are stylish and strong, and are well adapted for their work. Every Tuesday morning, and every other alternate morning, two stageleaves Madera, each accommodating 11 passengers. Every Wednesday and every other alternate morning, one stage holding 14, is sent out. Besides these regular runs there are always ready stages and teams by which parties of 80 or more can be carried forward at any time, upon reasonable notice.

Starting from Madera in the morning, the itinerary is as follows: Madera to Stitts, 12 miles; to Green's, 12 miles; to Foster (dinner station), 13 miles; to Fresno Flats (a pleasant mountain village), 7 miles; to Mariposa Big Tree station, 24 miles; to 11-mile station; to Yosemite, 13 miles—in all 90 miles. The stage reaches Big Tree station in the evening. In the morning tourists are carried to the Mariposa groves and returned to the station about dinner time, and thence they are taken to Yosemite, arriving about 6:30 P. M. Returning from the valley, they start at 1 P. M. daily.

Besides the regular trains of the S. P. R. R. passing through Madera, a special express for the accommodation of Yosemite travel leaves San Francisco at 4 P. M., reaching Madera at 11 P. M. Returning the train leaves Madera at 5 A. M., and arrives in San Francisco at 11:45. As Madera can be reached from the south by all trains, there need be no loss of time by those coming to the valley from that direction. The cost of the round trip (to the valley and return) from San Francisco is \$59; from Madera, \$45.

Of the quality of the new Madera-Mariposa route, it may be said that the new road has a remarkably easy grade; so much so that it is said that a four-horse team can trot into the valley. It is considered the best mountain road of its length in the State. The improvement over the Merced route is quite noticeable in the reduced amount of expenditure for breakage and necessary repairs to wagons, as well as in other ways. The owners of the road are disposed to encourage its use, and we understand tolls are to be reasonable as could be expected, considering the cost of constructing the road. Any further information of the Madera-Mariposa route may be had at Miller's Agency, No. 2 New Montgomery street, S. F., under the Palace hotel.

It is an item of great interest in this connection to state that the California Central R. R. is already projected from Madera, and surveys are being made for the early construction of 50 miles of broad-gauge road Yosemite-ward. The project is said to be in the hands of capitalists of determination and abundant means. The road is eventually to pass over the Sierra Nevada, through what is called the Mammoth pass on the headwaters of the San Joaquin river; thence into the Owen River district in Mono county. Such a road would open up a wealth of scenery superior, perhaps, to any yet invaded by the rails on the Pacific coast.

A LARGE Bruckner furnace has been bought for the Windsor Co.'s mill at Pinal, Arizona. The furnace and new machinery will be in running order in about two weeks on the immense mass of rich ore on the dump of the Last Chance and other mines.

GEORGE DALY, the well-known mining superintendent, has struck it rich in New Mexico, as will be seen by the items in our "Mining Summary." This is to assume charge of the new mines being opened by George D. Roberts and others in southern New Mexico.

IDAHO has an area of 55,228,160 acres, of which 12,000,000 acres are agricultural or may be reclaimed by irrigation; 25,000,000 acres of pasture lands; 10,000,000 of timber lands, and the remainder mineral, lava and mountainous lands.

IDAHO bullion, amounting to \$25,000 was received by Wells, Fargo & Co. at Winnemucca the other day.

FIVE arastras are being used at the Invincible mine, Calaveras county.

### News in Brief.

SALMON have reached the McCloud river.

A SMOKE-NUISANCE ordinance has been passed for Chicago.

THE school levy of California has been reduced to \$1,300,000.

THE Senate ratified both Chinese treaties, without amendment.

THE Bey of Tunis steadily persists in refusing the French proposals.

THE Russian government has decided to discontinue public executions.

THE steamer *Belize*, from New Orleans for Copenhagen, has foundered at sea.

THE losses sustained by the cloudburst in Canyon City, Oregon, approximate \$6,000.

FORTY artesian wells have been dug in New York city, upon an average depth of 400 ft.

INDIAN JOHN, chief of the Siuslaws, highly respected by the whites, died on the 18th of April.

KIEFF Jews now in Podolia have been maltreated, and troops have been sent to their protection.

CORK and Kilkenny are proclaimed under the Arms Act; also, King's and Queen's counties.

MARK McDONALD, D. O. Mills, Jay Gould and Dr. Green of the Western Union are coming to California soon.

A CALIFORNIA lion, which measured ten feet from tip to tip, was recently shot on the Noyo river, Mendocino county.

It is stated that the Governor-General of Canada will return to England after his Manitoba trip and resign his position.

IMMIGRANTS are pouring into the country through New York, at the rate of 18,000 a week. The money they bring averages \$100 each.

THE Northern Pacific has contracted for 64,000 tons of rails to be delivered this year. This will equal 550 miles of road. All but 5,000 tons are steel.

CARDINAL MANNING has forbidden the use of halls of Catholic clubs, or assembly rooms of total abstinence societies, for meetings of the Land League.

THE State's attorney at Louisville has brought suits for \$350 against the Louisville and Nashville railroad, for running trains and employing men on Sunday.

THERE has been some talk of dividing Texas into two States, but the Texans take little interest in the matter, and say there is no sentiment at home favoring the division.

THE Indians on the Klamath reservation are said to be more industrious than any other tribe on the coast, and are making more rapid progress in civilization than any other tribe.

It is said Princess Louise absolutely refuses to return to Canada, and that the Marquis of Lorne will in consequence resign the Governorship of the Dominion and return to England.

It is said that the arrest of the Grand Duke Constantine will likely be followed by a Nihilist movement of the sailors on the Russian fleet, who are said to have an understanding with a number of other Nihilists at Odessa.

BRITISH residents in the Transvaal are leaving no stone unturned to upset the settlement. There are exaggerated accounts of the doings of both Boers and natives, but there is sufficient truth in them to give cause of anxiety.

AMERICAN machinery, which under the old tariff in France paid from 18 to 36 francs duty, will now pay but six francs, the same as English machinery. A large quantity is awaiting at Havre, to be entered under the new tariff.

THE piles are all down for the National City railroad wharf. They will hereafter build the iron extension. Railroad material keeps arriving in San Diego in greater bulk every steamer. A goodly part of it is taken by lighters to National City.

A Lancashire family, named Siddon, have had a wind-fall of property valued at £4,000,000, which had been in chancery since 1857. The property was bequeathed to John Siddon, who died in the workhouse. His heirs inherit this vast fortune.

THE Bey of Tunis has addressed a fresh protest to the Powers, imploring them in the name of humanity to stay the horrors of war. The report is confirmed that five powerful native tribes have revolted, and refuse to submit either to the Bey or the French.

A DISPATCH from Paris says: It is probable that the Monetary Conference, after an exhaustive discussion, will adjourn for an indefinite period, to give time for direct negotiations between the various States on the basis of the conclusions reached by the Conference.

In the Commons Gladstone moved an address praying the Crown to provide a monument in Westminster Abbey to Beaconsfield. He appealed to the House to not make it a subject of partisan discussion. It was adopted—yeas, 336; nays, 54. A similar resolution was adopted by the Lords.

A DISPATCH from Berlin says that the Free-traders are much dissatisfied at the hills recently introduced in the Federal Council for increasing the duties on grist and introducing a duty on grapes. When the hills come before the Reichstag, the Left intend to introduce a motion for the abolition of the duties on corn.



## Traveling Agents.

We want several canvassing agents who will make it their business to solicit subscriptions and advertising for our first-class progressive newspapers. Men of ability and experience can secure good pay and permanent employment. Send references and state your past occupation, etc., to the publishers of this paper.

### Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSBORN—San Francisco.  
A. C. KNOX—Sonoma, Napa, Lake and Mendocino counties.  
G. W. McGRW—Santa Clara county.  
M. P. OWEN—Santa Cruz County.  
W. A. WRIGHT—Merced, Tulare and Kern counties.  
N. E. DOWD—San Bernardino Co.  
J. R. C. HOAG—California.  
B. W. CROWELL—Tehama and Butte counties.  
D. W. KELLER—Santa Barbara, Ventura and San Luis Obispo counties.  
A. LEONARD MEYER—Utah, Idaho and Montana Ter.

PERSONS receiving a sample copy of the MINING AND SCIENTIFIC PRESS with this notice marked, are requested to examine the merits of the same, and consider fairly its claims for support, and if consistent, subscribe for the paper through the P. M. or agent delivering it, or otherwise. We will send it, on trial, at the rate of \$4 per annum for any period the reader may wish. Please notice our terms elsewhere, and if desired, send for further samples and information. Those who can circulate this No. further to our advantage are invited to do so.

IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sealions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good vigor. A day at Woodward's Gardens is a day well spent.

A gentleman just arrived from Colorado who is thoroughly posted in the treatment of refractory ores, and who has been a director for 3 years in the Austrian Government Reduction Works in Europe, would like to engage his services to a Mining and Reduction Company, either as Superintendent or Assistant, or to take charge of the Assay Department. Address H. S., this office.

How to STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

The State Mining Bureau, No. 313 Pine street, is open to the public from 10 o'clock A. M., to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

### Metals.

[WHOLESALE.]  
WEDNESDAY, May 11, 1881.

IRON.—		
American Pig, soft, ton.....	32 00	33 00
Scotch Pig, ton.....	28 00	27 00
American White Pig, ton.....	28 00	27 00
Oregon Pig, ton.....	—	—
Refract Bar.....	4 1/2	8
Horse Shoes, keg.....	7 00	8 00
Old.....	—	25
Norway, according to thickness.....	8 1/2	9 1/2
STEEL.—		
English Cast, lb.....	16	18
Black Diamond, ordinary sizes.....	13 1/2	15
Drill.....	9	10
Flat Bar.....	—	16
Flaw Steel.....	9	10
COPPER.—		
Ingot.....	—	52
Sheet.....	—	25
Sheating, Tinned 14x18.....	—	42
Nails.....	—	—
Bolts.....	38	42
Bar.....	—	22
Prepatite, 100 lbs.....	18	19
LEAD.—		
Pk.....	4 1/2	5
Bar.....	—	6
Pipe.....	—	8
Pipe, soil.....	—	9
Shot, discount 10% on 500 Bags.....	—	2 10
Drop, per bag.....	—	2 30
Bud.....	—	2 50
Chilled.....	—	2 50
TIN PLATES.—		
10x14 Charcoal.....	—	10 50
10x14 Coke.....	10 00	10 00
Banca Tin.....	—	20 00
Australian.....	—	20 00
L. C. Charcoal Roofing 14x20.....	—	20 00
20x25.....	20 00	21 00
ZINC.—		
By the Cask.....	—	10
Zinc Sheet 7x3 ft. 7 to 10 lb, less the cask.....	10 1/2	11
NAILS.—		
Assorted sizes.....	4 00	4 75

### Leather.

[WHOLESALE.]  
WEDNESDAY, M., May 11, 1881.

Sole Leather, heavy, lb.....	30	32
Light.....	25	28
Jodot, 9 to 10 Kil., doz.....	35 00	45 00
11 to 13 Kil.....	50 00	65 00
14 to 16 Kil.....	55 00	72 00
Second Choice, 11 to 16 Kil.....	40 00	65 00
Simon, Ulmo, Females, 12 to 13 Kil.....	52 00	66 00
16 to 17 Kil.....	61 00	75 00
16 to 17 Kil.....	67 00	79 00
Simon, 18 Kil.....	61 00	64 00
20 Kil.....	—	85 00
24 Kil.....	70 00	73 00
Kips, French, lb.....	1 00	1 3
Cal, doz.....	45 00	51 7
French Sheep, all colors.....	12 00	15 00
Eastern Calf for Backs, lb.....	1 00	1 25
Sheepskins for Topping, all colors, doz.....	9 00	10 00
For Hinges.....	6 50	10 00
Cal. Russet Sheep Linings.....	3 00	5 50
Boat Legs, French Calf, pair.....	—	4 50
Good French Calf.....	—	4 00
Best Jodot Calf.....	4 75	5 25
Leather, Harness, lb.....	35	40
Fair Bridle, doz.....	45 00	66 00
Shirring, lb.....	33	37
Buff, lb.....	30	36 00
Hut, lb.....	17	20
Wax Side.....	19	23

## Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending May 10, 1881.						
HIGHEST AND LOWEST BAROMETER.						
May 4	May 5	May 6	May 7	May 8	May 9	May 10
30.057	30.043	30.063	30.017	30.017	29.902	29.922
30.027	30.001	29.983	29.977	29.895	29.829	29.858
MAXIMUM AND MINIMUM THERMOMETER.						
62	62	65	64	64	60	65
50	54	50	50	54	52	50
MEAN DAILY HUMIDITY.						
77.3	76.3	68.3	73	90.7	75.3	67
PREVAILING WIND.						
W	W	SW	W	W	W	W
WIND—MILES TRAVELED.						
323	351	195	200	284	388	226
STATE OF WEATHER.						
Fair.	Fair.	Clear.	Fair.	Foggy.	Fair	Clear.
RAINFALL IN TWENTY FOUR HOURS.						
.05						
Total rain during the season, from July 1, 1880, 29.00 inches.						

## Mining and Other Companies.

Persons interested in incorporated shares will do well to reconsider the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for this same.

### DIVIDEND NOTICE.

OFFICE OF THE  
Standard Consolidated Mining Company.  
SAN FRANCISCO, MAY 2, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, Dividend No. 28, of Seventy-five (75) cents per share, was declared, payable on THURSDAY, May 12, 1881, at the office in this city, or at the Agency of the Nevada Bank of San Francisco in New York.

WILLIAM WILLIS, Secretary.  
Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

### DIVIDEND NOTICE.

OFFICE OF THE  
Silver King Mining Company,  
SAN FRANCISCO, MAY 10, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 17) of Twenty-five (25) Cents per share was declared, payable on MONDAY, April 16, 1881, at the office of the Company, Room 19, 323 Montgomery street, San Francisco, Cal. Transfer books will be closed on April 11, 1881.

JOSEPH NASH, Secretary

### REGULAR DIVIDEND NOTICE.

OFFICE OF  
Northern Belle Mill & Mining Company,  
SAN FRANCISCO, CAL., MAY 10, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 44), of Fifty (50) Cents per share, was declared, payable on MONDAY, May 16, 1881. Transfer books closed on Thursday, May 12, 1881, at 3 o'clock P. M.

WM. WILLIS, Secretary.  
Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

### EXTRA DIVIDEND NOTICE.

OFFICE OF  
Northern Belle Mill & Mining Company,  
SAN FRANCISCO, CAL., MAY 10, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, an Extra Dividend (No. 45), of Twenty-five (25) Cents per share, was declared, payable on MONDAY, May 16, 1881. Transfer books closed on Thursday May 12, 1881, at 3 o'clock, P. M.

WM. WILLIS, Secretary.  
Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

## Amusements.

### BALDWIN'S THEATER.

THOMAS MAGUIRE.....Manager.  
CHAS. H. GOODWIN.....Treasurer.  
J. P. CHAPMAN.....Assistant Treasurer

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Corner Market and Powell Streets. Open every evening and Saturday matinee. Box office open daily.

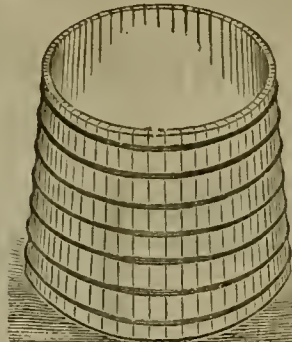
### STANDARD THEATER.

AMORY SULLIVAN.....Manager

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MANUFACTURER OF



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Prof. Hayden's Geological survey of the northern wilds, comprising his explorations in the Big Horn, Gray Bull, Yellowstone and Sun River Countries, Wind River, Teton, Little Rocky and Bear Paw Mountains. Their geology and physical features. Where the survey found "paying prospects," going from 6 to 25 cents in gold to the pan. Immense gravel bars prospecting 3 and 10 cents per pan. Water abundant for hydraulic mining. Extensive gold and silver bearing quartz lodes, one mammoth ledge averaging \$15.00 in free gold per ton, from surface croppings. The classes of country rock peculiar to each section, which interest the miner, as being the most congenial for the existence of rich veins and placers. A valuable work (with map), forming a complete intelligible, systematic guide and companion for miners and gold hunters, desirous of prospecting in the northern Rockies and localities mentioned. Terms, \$5 per copy; 5 copies for \$20. Address J. A. CAMPBELL & CO, Evanson, W. Y. Ter. Box No. 119. (Mention this paper.)



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E. & F. N. Spon, 446 Broome St., N. Y.

This paper is printed with Ink furnished by Chas. Emen Johnson & Co., 509 South 10th St., Philadelphia & 59 Gold St., N. Y. Agents for Pacific Coast—Joseph H. Dorety, 527 Commercial St., S. F.

### J. S. PHILLIPS, M. E., ETC.

May still be consulted by old friends. Address No. 1 Wall Street, New York.

## Business Directory.

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I am respectfully yours, etc.,

GEORGE OLARK,

Foreman Sierra G. and S. M. Co.

Address all orders to

Excelsior Powder Company,

Room 40, Merchants' Exchange,

SAN FRANCISCO, CAL.

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### BOILER COVERING

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A. J. SEVERANCE & CO.

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Marine, Stationary and Portable Boilers, Smoke Stacks  
Hydraulic Pipe, Oil or Water Tanks, Ore and  
Water Buckets, Gasmeters, Girders,  
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Repairing promptly attended to at the lowest possible terms.

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STEVENSON'S PATENT

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Golden State Pressure Blowers.

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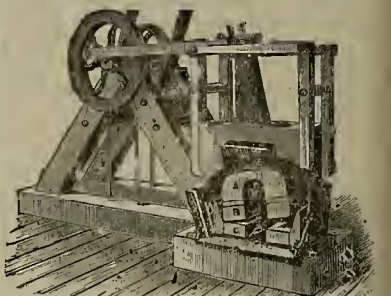
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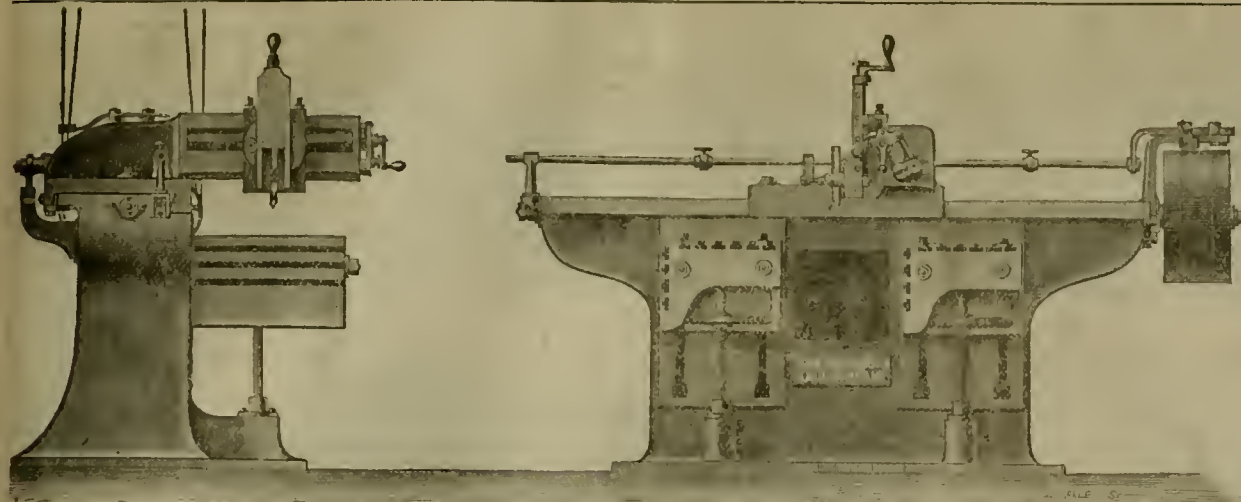
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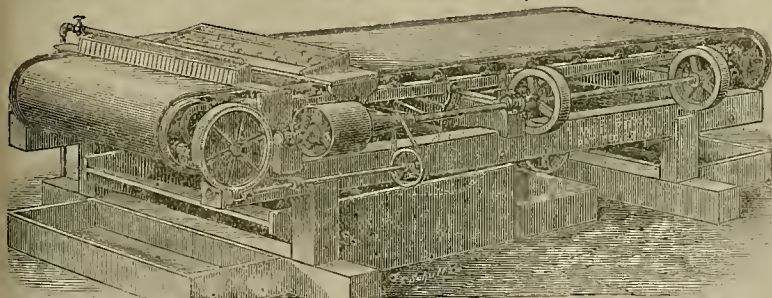
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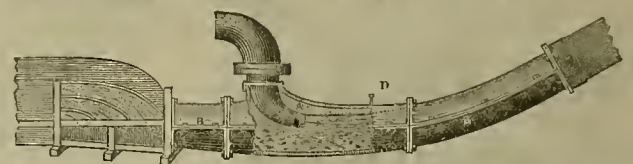
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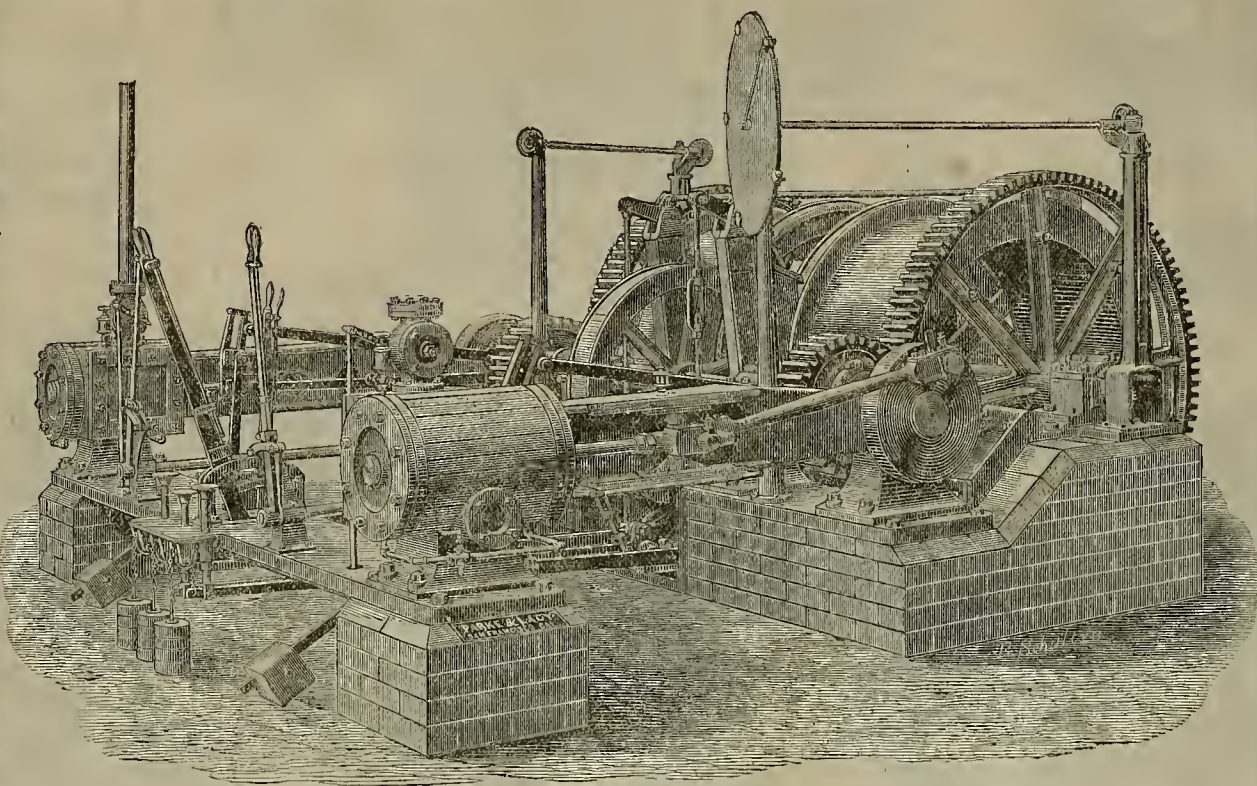


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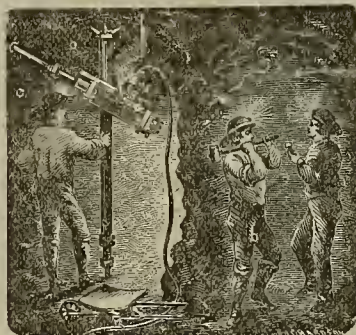
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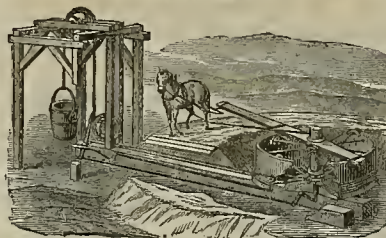
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, MAY 21, 1881.

VOLUME XLII  
Number 21.

## A Water Carrying Tortoise.

At a meeting of the Academy of Sciences the other evening, a very fine specimen of the desert land tortoise, from Cajon Pass, San Bernardino county, in this State, was received. The specimen had been carefully prepared, and was as large as an ordinary bucket. This tortoise is a native of the arid regions of California and Arizona, and Prof. E. T. Cox, who was present, related a curious circumstance connected with it.

He found on dissecting one of them that it carried on each side a membrane, attached to the inner portion of the shell, in which was about a pint of salt water, the whole amount being about a quart. He was of opinion that this water was derived from the secretions of the giant barrel cactus, on which the tortoise feeds. This cactus contains a great deal of water.

The tortoise is found in sections of country where there is no water, and where there is no vegetation but the cactus. A traveler suffering from thirst could, in an emergency, supply himself with water by killing a tortoise. They are highly prized by Mexicans, who make from them a delicious soup. The foxes of the desert attack the tortoise and finally overcome it by dragging them at times for miles.

B. B. Redding said he would try to obtain a live one for the Academy, in order that its habits and peculiarities may be carefully observed and noted. He instanced being on the Gallapagos islands in 1849, and assisting in the capture of 92 land tortoises, varying from 450 to 600 lbs. in weight, which the vessel brought to San Francisco and sold for more money than the whole cargo of lumber nested at that time. They were two months on board the vessel, yet ate nothing and those killed had in them considerable quantities of pure water. They live on the high lava rocks, which rise as mountains on the island, where there are no springs or streams, and the only dependence of animal life for water is necessarily upon the irregular and uncertain rain showers.

It may be mentioned that the tortoise are of different species, though they may have the same habit in respect of carrying water. The famous ediths species of the coasts of the Pacific and Indies, of which the headquarters is at Gallapagos islands, is the *Testudo Indica*. They grow to five, six, and even seven hundred pounds or more. Those found in this State are smaller and are the *Agassii* species, first described some years ago by Dr. J. G. Cooper, if we recollect aright. Those Mr. Redding describes from the Gallapagos were offered water while on the ship but refused it. Yet when killed they all contained water. The place they inhabit is a dry one, lacking water. It may be that they go to the high places and obtain it from the vegetation, the same as our species does.

## Stamps in Black Hills.

The Deadwood Times says: If the mines in the hills did not pay, the milling business would certainly not be increased from year to year; that they are a sufficient guarantee for the permanency of these mines. The following is a complete list with the number of stamps:

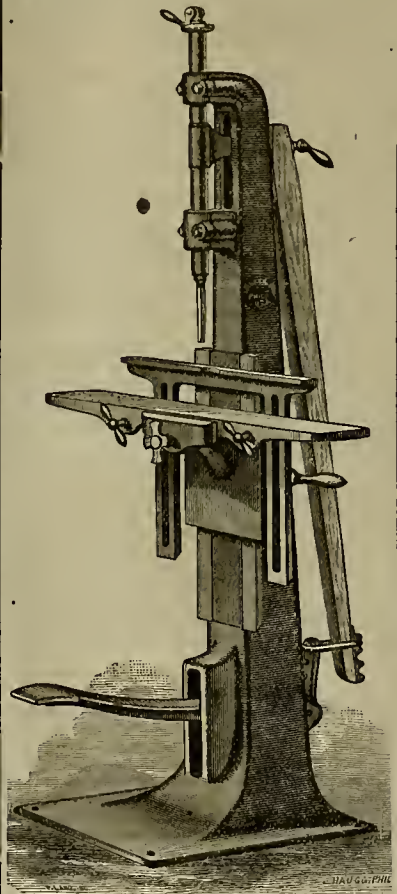
MINES	STAMPS	MINES	STAMPS
Snodgrass	20	Pearson's	20
Portland	20	Fairview	20
Marshall's	15	Hidden Treasure	30
Gwin Mills	20	Moore's	20
Thompson's	20	McLaughlin's	20
Racine	20	Casey's	20
Morrison & Co.	20	Hildebrand's	25
Homestake	20	Deadwood	110
White's	20	Golden Terra	80
Golden Star	120	Caledonia	60
Highland	120	Elliott's	30
Homestake, No. 2	80	Snyder's	20
Lewis	10	Girdler & Orr	25
De Smet	80	Esmeralda	60
Pinney	20	Ludwick's	20
Great Eastern	20	Spring & Lancaster	30
Union	25	Champion	30
Bogle's	20	Lexington	30
Thompson's	20	Pennington	20
Picket & Hale	30		
Total	1,405		

The Oro Grande mill, San Bernardino county, is working \$40 rock.

## Wood-Working Machinery.

We illustrate herewith a well-designed foot-mortise, constructed by Messrs. Walker Bros., of Philadelphia. This firm is among the late ones to enter the field as constructors of wood-making machines; but these designs show great skill, and some of their machines, we have seen, maintain Philadelphia's reputation.

The San Francisco Tool Co. propose to act as agents for Messrs. Walker Bros., and have now a number of their machines on hand and in transit.



New Mortising Machine.

We expect to illustrate in our future numbers, some of the larger and more important machines made by this firm. The machines are, at this time, scarcely known on the Pacific coast.

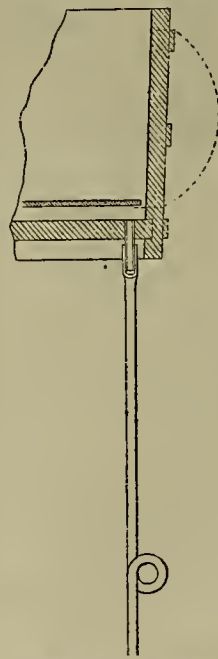
A BIG CONTRACT.—The Carson Times says: "Smart & Sons, of Carson, have just completed an extensive logging contract with the Carson and Tahoe Lumber & Fluming Co. The Messrs. Smart have cut, hauled and delivered in a ditch two miles from Rowland's, Lake Tahoe, 4,000,000 ft. of logs, for which they received \$3,500 per 1,000, the contract aggregating \$14,000. The fluming company dug the ditch at a cost of nearly \$3,000. It is fed by the waters of the Little Truckee river, and leads direct to the lake at a point one mile west of Rowland's. The logs are towed across to Glenbrook, then sawed up and thence flumed to Carson."

It is supposed that the celebrated "Blue Bucket" diggings, of Oregon, have been re-discovered. The gold was found in 1845 by the Joe Meek emigrant party, and search has ever since been made for the spot. It is supposed that it is on the Mathew reservation. The prospectors said to have found the place are very secret about it.

## Suction Pipe for Ore-Leaching Tubs.

In Aaron's recently published book on "Leaching Gold and Silver Ores," he describes a method by which, in cases of difficult leaching, filtration may be facilitated by means of a suction pipe. This is simply the discharge pipe of the leaching vat, made of stiff hose, or of wood, instead of soft rubber as in other cases, and extended to a vertical depth of from 6 to 25 ft. The hose, near its lower end, is coiled once around, as in the accompanying diagram, and secured by a piece of wire; or, a re-curved piece of lead pipe may be inserted in the end of the discharge pipe, or again, the end may be immersed in a cup of water, although this plan is less convenient than the others. The object, in either case, is to prevent the entrance of air.

Though not the general practice, it is well to have a vent pipe to prevent disturbance of the filter by the air or gas beneath it, when displaced by the entrance of water, especially if the discharge pipe is hung up, closed as in the case of using suction, or occupied by the introduction of water below the filter, as in com-



Suction Pipe for Leaching Vats.

mencing the washing of silver ore. There are several methods of arranging a vent pipe. Perhaps the simplest is the following, represented by a dotted line in the diagram.

When the ore vat is disconnected from the chlorine pipe a short piece of rubber tube is connected at one end with the nipple through which the chlorine was introduced, and at the other with the upper part of the vat, by being inserted tightly in a hole bored through the side, just below the cover. The short tube may be left permanently on the lead nipple, and connected with the chlorine pipe.

Whether water is introduced from above or below the ore, the air or gas beneath the filter will pass through the tube, and return to the vat above the ore. If the chlorine nipple is to be used thus as a vent, it should be set in as high as possible, consistently with the delivery of the chlorine below the filter. A special vent pipe may be made by boring a one-quarter inch hole lengthwise through a strip of wood, and attaching the strip to the inside of the vat by means of wooden pins. It should terminate at one end immediately below the vat cover, and at the other, beneath the hurlap on the gravel. The upper end must be plugged, and a transverse hole bored to connect with the vertical passage. This aperture must be plugged during the chlorination, and opened when water is admitted.

## Academy of Sciences.

At the regular meeting of the Academy of Sciences held on Monday last, Governor Geo. C. Perkins and Hon. James G. Fair were both nominated for life membership. A very perfect specimen of stone axes, found on the Tucon mountains, Arizona, was presented by E. P. Gerald. Prof. Davidson, Mr. Redding, Prof. Cox, all thought it the most perfect specimen they had seen. W. W. Dodge presented two specimens of a very rare bird—emperor geese, from 2,200 miles above the mouth of the Yukon river, Alaska.

Two horned toads and a fine collection of carboniferous fossils from the confluence of the White Mountain and Black river, Nevada, from Patrick Gannon. An ovary of a common hen, containing over 500 undeveloped eggs of all sizes, from Mr. Pyson. A desert-land tortoise from Cajon Pass, San Bernardino county, originally described by J. G. Cooper, and named after Prof. Agassiz. It was presented by Tay & Lawrence. We refer to this donation in another column.

Prof. Davidson said he had carefully examined the famous Danish collection of stone axes at Copenhagen, and also that at Washington, and in neither had he observed any equal in beauty of form, and so perfect as the stone axes presented last evening.

Mr. Redding said this kind of stone axes was only found in Arizona and New Mexico, among a pre-historic people who built houses and used rafters to make partitions, which they cut and dressed with these stone axes. They are well adapted to splitting wood.

Dr. H. W. Harkness said these beams in the Casa Grande appeared to have been thus hewn. Prof. Cox said axes somewhat similar in form were found in Ohio, Indiana and Kentucky.

Dr. Harkness reported his microscopic observations on a package of what purported to be part of a shower of sulphur, but turned out to be the fine pollen of a species of pine tree. These grains float easily in the air, and blow to great distances. Whirlwinds sweeping through pine forests carry them often a thousand miles, and when they fall on snow-covered surfaces, the effect is often startling. These popularly misnamed sulphur showers are known to fall in patches, at some part of the world, almost every year. Some curious showers, however, are not so easily accounted for. About 20 years ago a part of the famous great shower, which fell at San Jose, California, was sent here for examination, and proved to be the intestines of a chicken.

Prof. Davidson made some remarks on Dr. Dall's theory of the non-existence of the Japanese current in the Behring's straits. We give his remarks in another column. Messrs. Krauss, senior and junior, sent by the Bremen Geographical society to explore the Siberian peninsula and study the country of the Tchoukchees, were presented to the Academy, and a hearty welcome was extended to them. These eminent naturalists are awaiting some conveyance to the field of their researches.

A crustacea resembling a young lobster, taken in the open ocean 900 miles southwest of San Francisco, was presented by Capt. John O. Ladd, who preserved it for the Academy. Upon examination it was found not to be a lobster, but an interesting specimen of another animal.

NET GAIN.—While in the banking house of Ridout, Smith & Co., Saturday, says the Oroville Mercury, we saw 1,000 ounces of large, coarse gold, taken from the Roberts & Kendall mine, situated one mile and a half from Forbestown, in what is known as Garden Ranch Flat. This was the result of a four-months' clean-up, and was valued at \$17,500. The cost of water and the necessary expenses in running the claim during that time was \$6,300, leaving a net gain of \$11,200. Some time ago the owners were offered \$18,000 for the claim, and came very near taking it, but now would not take double that amount. The gentlemen have plenty of pay dirt in sight, and lots of water, and will return to make another run.

A STAMP mill is being built in San Antonio canyon, near Pomona, Los Angeles county.



## Copper Smelting—Its History and Processes.—No. 6.

[By HENRY HUSKEY VIVIAN, M. P.]

The first difficulty is got over at Mr. Lambert's works by using a muffle calciner heated by the waste heat of the smelting furnace; but when we consider the varying intensity of the heat given off at different periods of the ore-furnace charge, ranging from almost none at all at the period of skimming and charging up to the highest temperature during the melting process, I cannot doubt that much irregularity must occur in the calcining process which must militate against the regular working of the chambers, especially when joined to the inrush of atmospheric air when the calciner doors are down for stirring. I have seen the muffle calciners at Mr. Lambert's, and have read his evidence and that of Mr. Fenwick Allen, the manager of Messrs. Newton Keates & Co.'s works in Lancashire, where, as well as at the St. Helen's works, muffle calciners are used, heated on the Siemens system. Unfortunately, neither of these gentlemen goes fully into the question of the profitable working of muffle calciners; but I think I am justified in saying that they do not appear in several respects to give results equal to the Gerstenhoffer system. In Mr. Allen's answer to question 11,646 of the Noxious Vapors Commission, he says: "We diminish the escape by condensing the whole of the acids given off in the calcining process, and at the very outside it would be from 30% to 40% of the total sulphur given off in our works." I should have been glad if Mr. Allen had been able to give the committee, as I did, an accurate debtor and creditor account of the whole of the sulphur which entered the works. Again, he was unable to inform the Commission (11,660) what the percentage of niter used at his works is; but he says generally (11,658) that the gases are very dilute, and that they require three times as much niter as in ordinary kilns; and he also says (11,657) that the sulphuric acid costs 5s. more than if made from pyrites bought and burnt in kilns. Mr. Lambert's evidence as to the results of muffle calciners is even less favorable. I think I have now pretty nearly exhausted the subject of calcination, and may proceed to smelt my ore.

In considering the question of melting the calcined ore, I think we ought, in the first instance, to pass in review the two systems of reverberatory and blast-furnace smelting—"South Wales against the world!" Each system has its advantages and disadvantages. Let us weigh them.

### The Blast Furnace

Is slightly, very slightly in most places, more economical in the cost of fuel, and it undoubtedly, and in all cases, produces a cleaner slag; but its working is much more complicated, and it has a constant tendency to reduce the oxide of iron contained in the calcined ore into metallic iron, and thus to produce a mass of infusible matter at the bottom of the furnace, which, in no long period, causes the entire or partial destruction of the furnace, according to the arrangements made beforehand to extract it. Even in the best managed continental works, I have positive proof that these so-called "iron sows" are produced; in fact, they are an almost unavoidable incident of melting calcined copper ores in blast furnaces, especially high blast furnaces, owing to the partial reduction of oxides of iron by the ascending carbonic oxide before it reaches the melting point, where it would be able to combine with the silica, which we must assume has been provided for it. It has, I am aware, been proposed to get over this difficulty by taking off the gas a few feet above the melting point; but no great success can have attended this, from the fact that "iron sows" are still produced in considerable quantities in the best managed continental works. Another great drawback to the use of the blast furnace is, that it can only treat a comparatively rough mixture; much fine ore would soon cause it to "gob" or choke. The consequence is, that resort is had to slags to keep the furnace open, if rough ore cannot be obtained, even if the slag does not require remelting. I know of a case in which thousands of tons of slag are thus uselessly melted. When lead ore is melted in blast furnaces, it is possible to agglomerate it in the calciner so as to cause the furnace to "drive" well; but copper ore would require so high a temperature to agglomerate it, when sufficiently calcined, that it would be more economical to carry it a trifle farther and melt it in a reverberatory furnace at once. In blast furnaces, for the above reasons, I doubt whether ores could be dealt with, as they arrive from all quarters of the globe, varying enormously in their constituents and characteristics. Nothing in reverberatory copper smelting needs greater care than the formation of a proper mixture for the ore furnace; but the problem becomes vastly more complex if the ore furnace be a blast furnace.

I said that the blast furnace uses less fuel than the reverberatory. Roughly, I believe, the case stands about as follows: A blast furnace uses from 15% to 25% of coke, calculated on the quantity of ore smelted, according to the nature of the ore and the furnace; take it at 20%. A reverberatory uses, say, 45% of coal; but coke is about 2½ times more costly than coal, therefore the expense of the blast furnace would be as 50 to 45 of the reverberatory. If steam power is used for the blast, it makes the case of the blast furnace so much worse, unless the waste gases can be utilized to generate steam; but if fuel has to be transported to a distance, although the freight on coke is more than on

coal, the balance may slightly incline in favor of the blast furnace.

I also said that a blast furnace produces a cleaner slag than a reverberatory furnace. I believe that such is invariably the case, owing to the higher temperature at the melting point, which causes the slag to be more fluid, and thus permits the heavy regulus to pass more easily through the slag; the deep well of the blast furnace also assists in the last named effect. I estimate the difference between blast-furnace and reverberatory slags to be about 1% equal in money to about 3s. per ton of ore. As to the item of wages, I cannot speak positively, because so much must depend on the nature of the ore and the furnace; but in all cases with which I have had to do, the blast furnace cost is in excess of the reverberatory. There is one other considerable disadvantage in smelting in a blast furnace, namely, that from the same calcined ore a reverberatory furnace will produce a much richer regulus than a blast furnace; the former is an oxidizing, the latter a deoxidizing furnace. During the exposure of the ore on the bed of a reverberatory furnace, calcination goes on continuously, sulphur and the sulphuric acid partially formed in the previous calcination passing off. We found, on careful trial, that during the smelting of calcined ore in the ore reverberatory furnace, 13% of the original contents of the ore in sulphur were driven off. I have no similar data as to what sulphur is driven off in the blast furnace. The smoke issuing from blast furnaces proves beyond doubt that some is sublimed; but from the deoxidizing condition of the furnace, all the sulphates must be reduced, some to sulphurous acid probably, and some to sulphide of copper. As a fact, blast-furnace regulus is always coarser than reverberatory regulus, which means that more expense has to be incurred in the subsequent processes.

### The Reverberatory Furnace

Is a simple and easily worked furnace, forming no metallic bottoms until the copper stage is reached, and capable of dealing with all ores, as Ulrick Frosse found out 300 years ago. Whether calcined ore is melted in blast or reverberatory furnaces, the same results ensue, namely, the earthy matters (chiefly silica) originally contained in the ore combine with the sesquioxide of iron to form a slag, while the sulphur, purposely left in the calcined ore forms sulphides of iron and copper, which, being of greater specific gravity, sink through the slag, separating themselves more or less completely from it, according to the nature of the slag and the temperature at which it is melted. For this cause, the copper smelter must be careful so to combine his ores as, on the one hand, not to form too stiff or quarry quartz, a slag which hinders the operation of melting, and prevents the regulus from sinking freely through it; and on the other hand, too heavy a slag, which, while it may melt easily, is so nearly of the same specific gravity as the regulus as to cause the separation to be imperfect on that account. He must also be careful not to produce too rich a regulus, because the perfect separation of regulus and slag is next to impossible, and each prill of regulus which remains mechanically suspended in the slag carries with it more copper if rich than if poor. As I think I before said, we do not like to push our "coarse metal" or ore-furnace regulus beyond about 33% of copper; it contains about 23% of sulphur, and the remainder iron, arsenic, and other impurities, resulting from the original ore. I see Le Play gives "coarse metal" as containing 29.2% sulphur. According to our experience, it does not usually contain more than 23%. The ore-furnace slag consists chiefly of silicate of protoxide of iron and silica in suspension. Dr. Percy's concluding observations as to the reactions which take place in the ore furnace are concise and clear; anyone who desires to study them in detail can do so by referring to the 345th page of his work; indeed, the whole of the chemical changes which occur in copper smelting are set forth with admirable terseness and precision.

(TO BE CONTINUED.)

It is stated that the Denver and Rio Grande Co. has expended more than \$50,000 in importing laborers to work on the construction of its line. Large numbers, after being obtained from a distance at great expense, desert almost as soon as they reach the road and make for the mining camps, tempted by the prospect of getting rich in mining. This difficulty has induced the company to inaugurate a plan for importing several thousand trained workmen, together with a corps of engineers, from France. The company has had agents in Norway, Sweden and Italy, but they have not had much success in the first named countries, although the agent in Italy has secured nearly a thousand men, who will shortly arrive. It is believed that they will have greater success in France, yet it is considered doubtful whether the 10,000 men they desire can be obtained as rapidly as they are needed.

THE SULPHUR BUSINESS.—C. D. Rhodes, superintendent of the Humboldt Sulphur Co., informs us that they are now shipping 50 tons of refined sulphur from the mines to the railroad every week. Alex. Wise has four teams hauling the brimstone from the refinery works to the railroad, at Humboldt house, and they cannot take it away as fast as it is refined. They have found a large body of sulphur in the mine, and can keep the refining works running steadily without any trouble.—*Silver State.*

New quartz finds on the north fork of Flat creek, Shasta county.

## Electric Light in Mines.

[Read before the American Institute of Mining Engineers by OTTO A. MOSAS, Menlo Park, N. J.]

### On the Applicability of Edison's System.

The necessity for a more perfect safety-lamp than Davy's was announced by Sir Humphrey himself, in a paper read before the Royal Society, in which he first describes his beautiful deduction from studies on flame. He says: "If it be necessary to be in a part of the mine where the fire-damp is explosive \* \* the workmen may be lighted by a fire made of charcoal, which burns without flame, or by the steel mill, though this does not afford such entire security from injury as the charcoal fire."

This acknowledgement contains a germ of prophecy. Had the immortal discoverer of the arc electric light and the safety-lamp lived till now, he would have seen the fullest fruition of his scientific and philanthropic hopes combined in one invention, which I will take pleasure in showing you to-night.

Those of us (and I recognize many among you who have guided your steps by the "blende") who have been dazzled, soiled, confused and distracted by the flaring lamp, hung on the breast, head, or thumb, know how great the want, and have been frequently reminded of it while picking our devious paths over heaps of debris, or while examining the face of new and important cuttings. There are many here who, besides this discomfort, have felt the presence of the spirit of death burning blue in their lamps, and who, perhaps, have seen it fly heavenward from the shaft's mouth, bearing the souls of men.

The problem before us, which I will state as briefly as possible, is to obtain a mine lamp which will fulfill all the following conditions:

1st. It must be free from danger, in its use and presence, both to master and man; for it should be an axiom with the mine owner that his first duty is to consider the safety of the employee.

2d. It should afford an abundant, clear, white and penetrating light.

3d. It should not heat the air, nor render it impure.

4th. It should be perfectly reliable as a source of light in all varying conditions of the atmosphere.

5th. It should be available as an instantaneous danger signal.

Before describing Edison's lamp it may be well to enumerate, in the order of their introduction, the systems which are or have been in general use, or which have been suggested, and to fairly state their advantages and disadvantages.

1st. The open light of various forms, more or less protected, and burning oils and fats. These lamps, in mines free from fire-damp, have only found favor on account of their cheapness. They are offensive in odor, insufficient in illuminating power, and in use most inconvenient. Preserving the forms of antiquity, they are their own index of the want of progress in this important implement of the mining art.

2d. The phosphorescent lamp, containing substances luminous after exposure to sunlight, which we have recently seen revived by certain visionary inventors, was suggested by Davy, who before deciding to employ the wire-gauze envelope for his safety-lamp, experimented with Cantor's phosphorus. He does not do more than merely mention this method as being unworthy of adoption.

3d. The Davy safety-lamp and its congeners, which have found general employment wherever there exists a danger of explosion. It is very safe, provided the light is kept low (say to one-half candle), and is not allowed to raise the surrounding gauze to a red heat, and further, that it be not exposed to currents of air. But as these conditions are just such as exist during the times when most light is required, it is sadly wanting in essential particulars.

As modified by Museler and others, who substitute glass for the wire gauze immediately around the flame, it has been much improved, so much so that in Belgium it has been entirely superseded by Museler's lamp, although in England the weight of Davy's name and the prejudices of a solid gratitude have combined to keep it in general use. This lamp may still be employed as a fire-damp indicator, but more perfect ones, such as Ansell's, may be used automatically and in connection with a better system of illumination.

4th. The fluorescent lamp, probably due to Reitingler, was first practically applied by Dumas and Benoit. It consists of appropriate Geissler tubes set aglow by a continuous flow of sparks from an induction coil. Were the light of this lamp stronger, it would possess many of the advantages of Edison's, but, since from careful measurements made by Bergrath Lotner, it would take at least 25 of them to equal a standard candle, it will scarcely ever find employment except in localities rarely visited, or attract attention except as a scientific toy.

5th. The hermetically sealed voltaic arc light, has been employed by De la Rive, though it was first suggested by Louyat and Bouscain-gault. He proposes to use a hermetically sealed balloon containing two carbon points, a portable pile, and copper wires sealed to the balloon inclosing the carbons. Mechanical difficulties prevented this system being tested.

6th. The voltaic arc has been used as a source of light in open pits and other workings adapted to utilize its enormous concentration; but even when subdivided its application is extremely limited.

7th. Finally, there remains for consideration Edison's electric light, one that combines all desiderata, and supplies the requirements of the mine owner in practical and economic form. Edison's 16-candle power lamp is too well known to need description, but I will show you some modifications intended for mine illumination. Mr. Edison makes what are known as whole, half, third and quarter lamps, which are, respectively, of 16, 8, 5½, and 4-candle power. The electro-motive force employed in his system is standardized at 110 volts, and his lamp at 120 ohms resistance. Such a combination yields him a 16-candle power lamp in multiple arc, giving the light of an ordinary gas-jet. It is intended for domestic purposes, but is far too powerful for the necessities of the mine. An arrangement in which four quarter lamps, of 30 ohms resistance each, are nited in series, answers admirably.

The method to be adopted in applying the Edison light to mines is very simple. Wires run direct from the dynamo-electric machines to the different workings, supplying light to the shaft on their way. Each lamp, if desired, be immersed in water, or be protected from fracture by a coarse wire screen. The connections can be all made under water, and thus lamps may be put in or out of circuit without the slightest danger from the electric spark.

## San Bernardino Mineral Districts.

Lytle creek is the first creek west of the Cajon pass, in the San Bernardino range, and empties into the Santa Ana river. Numerous placer mines have been located and worked for nearly 30 years, but never with such promise of success as at present.

The Mohave gravel mines are located in Holcomb valley. This deposit of placer gold is 40 miles northeast of San Bernardino, at the headwaters of the Mohave river. A great many locations have been made, and prospectors are now making \$3 to \$5 a day in panning.

The Bear valley mines lie four miles east of Holcomb valley. The mines of this district are gold quartz, free milling ores occurring in large deposits. A 40-stamp mill was erected, and a failure made for lack of proper management.

The Lone valley mines are 12 miles east of Bear valley and 90 miles northeast of San Bernardino, by wagon road. There have been about 60 locations made in this district. The ores are mostly smelting, galena and carbonates; veins large and extensive.

The Black Hawk mines are located 80 miles northeast of San Bernardino and four miles north of Bear valley, on the east foot of the Sierra Nevada range. About 30 locations have been made. The ores are smelting, galena and carbonate of high grade.

Dry Lake district is 90 miles northeast of San Bernardino; gold and silver ores of high grade; 32 locations.

New York district is about 40 miles west of the Colorado river and north of the 35th parallel survey, also about 40 miles southeast of Ivanpah. There are eight large veins of silver ore in this district; average width, 4 to 12 ft., with large bodies of good ore which works from \$40 to \$60 per ton. These ores are rebellious and require roasting.

Alvord district is 100 miles northeast from San Bernardino, and 10 miles north of Hawley's station, on the Mohave river. Here the gold is found in a large vein of jasper, which assays from \$10 to \$120 per ton. Analysis by John T. Reed shows gold, iron, aluminum and quartz.

Ivanpah, the oldest and most thoroughly developed district in the county, lies 190 miles northeast from San Bernardino. The mines of the district yield milling ores of high grade, and have produced large quantities of silver bullion. The veins are small. There are two 5-stamp mills in the district.

Mohave district is 75 miles northeast from San Bernardino, on the eastern foot of the Sierra Nevada range. These mines are galena and carbonate, and assay \$16 to \$60 silver, and 30 to 50% lead.

Grape Vine district is 75 miles north of San Bernardino. The ores of this district are silver ores, horn silver and native silver. The vein matrix is sulphate of barata. A great many locations have been made in this district.

Calico Mountain district, situate seven miles from Waterman's mine, shows the same character of ore, low grade on surface, and assays from a trace of silver to \$240 per ton. The ledges are from 4 to 50 ft. in width.

Ord district is 70 miles northeast of San Bernardino. The ores of this district are principally gold, of rather low grade, but free milling. Pincarte District, 26 miles south of San Bernardino, was located May 14, 1880. Blind leads of free gold are the rule.

The Temescal tin mines are 30 miles south of San Bernardino, at the base of the Eastern Twin Peaks. They have been opened to a considerable extent.

Silverado District is 45 miles southwest of San Bernardino; ledges from one to three feet in width, bearing northeast, southwest; ore rebellious, and requires roasting.

San Antonia district is 30 miles northwest of San Bernardino. The placer mines of this district have been worked at intervals for many years, and have produced large quantities of gold.

The new mines in Silver Mountain district, 50 miles north of San Bernardino, and from 10 to 15 miles west of the Point of Rocks, on the Mohave river, are all recent discoveries.—*Cor. San Bernardino Times.*



MECHANICAL PROGRESS.

Spence's Metal.

We have already described in these columns the peculiarities and special advantages of Spence's metal in connection with the various purposes to which it is applicable. Notwithstanding the doubts with which it was at first received, we learn from our English exchanges that, although only a little over a year has elapsed since attention was first directed to this remarkable substance, it has already come largely into use for an infinite variety of purposes, both industrial and artistic. Actual experience has now shown its economy and efficiency, as attested by the highest authority. The English technical journal, *Iron*, says that amongst other uses to which the metal can be applied may be mentioned the following:

As a substitute for bronze, lead, type metal, zinc, carved marbles, and materials used in capuling bottles, in all of which cases its use is stated to be accompanied by a saving of from 50 to 80%, the figures being thus based upon actual practice, and the metal being used by several governmental departments, by the Metropolitan Board of Works, and by various public companies. Amongst the advantages possessed by Spence's metal we may refer to the following:—Its low melting point, its resistance to atmospheric or aqueous influences, its insensibility to the action of acids, its close resemblance to the antique bronze, its producing an exact impression of the mold, thus saving the labor of chasing; its extreme lightness, being half the weight of most of the metals in use and its cheapness.

No wonder, then, that with so much in its favor, its development in the industries and the arts has been so great that extended manufacturing facilities have become necessary. To this end a company has been formed under the title of "Spence's Metal Manufacturing Co., Limited," with a capital of £200,000 for the manufacture and sale of the metal. The company will acquire the lease of a piece of ground at Belvedere, on the Thames, where will be erected a manufactory, buildings and machinery sufficient to enable them to turn out 100 tons per week of the metal, and provision will be made for the further extension of the works if necessary. Pending the completion of the new factory, the metal will be produced at the present works. Mr. J. Berger Spence will take the position of managing director. With all these things in its favor the success of this metal in the future will probably bear no comparison with that of the past, great as that has been.

New Application of the Link-Belt.

The varied and far-reaching applications possible to a new and valuable invention are rarely seen at the outset, but develop from time to time, as the employment of the device becomes more general and wide-spread. The growing application of the link-belt is no exception to the this rule. This invention, which has long proved very useful in many ways, has recently found an entirely new application—to the propulsion of stern-wheel steamboats. In the past there has been no transmitting agent that would stand the exposure incident to driving the paddle-wheel of a stern-wheel steamer except the enormous beam, which must be duplicated, and, of course, with two engines occupying a large amount of space and weight of material by reason of the peculiar duty to be performed and slow motion required.

During the past year an enterprising firm in Chicago has substituted the link-belt for the beam, which device allows the engine to be placed nearer to the center of the boat, requires but one engine, and that of small size, by reason of the increased speed which can be employed. By this device a comparatively small engine may be employed, as simple as an ordinary sewing machine, and yet of sufficient power to drive the largest of the class of steamers alluded to.

Another important advantage gained by use of the belt is the facility with which the floats of the paddle wheel may be adjusted to the varying draft of the boat; for the wheel is so mounted that it may be readily raised or lowered bodily, even when in motion, without any derangement of the machinery. The vast number of uses to which this improved elevating and conveying device may be put, and its great capacity as a labor-saver in mechanical industry, is securing for it a most favorable reception among progressive mechanics everywhere.

**SECURING GLASS IN SKYLIGHTS AND ROOFS.**—A recent English patent shows what seems to us a very convenient and reliable way of fastening sheets of glass in skylight frames of either wood or iron. In the case of a wooden rafter a piece of sheet lead is cut three and one-half times the width of the rafter, laid across the rafter, projecting equally on either side, and nailed at intervals. The lead is then doubled back over the heads of the nails to the center of the rafter on either side and turned up at a right angle. The glass is then laid and the lead turned down over the face of the glass so that when finished the lead covers the glass the same width of the rafter. If T iron is used for a rafter the lead is doubled under the edge of the T instead of nailed, as in the case of wood, and in all other respects handled just the same as with wood.

Malleable Cast Iron.

In a paper read by M. Fourquignon before the French Academy of Sciences on malleable cast iron, he states that, as a bar softens, one observes throughout the mass an abundant deposit of amorphous graphite. Matters stand thus when the bar lies in an inert mass, as in anthracite coal; but when the pig iron comes in contact with a substance capable of burning or absorbing the carbon, a secondary reaction sets in. The liberated carbon having disappeared from the superficial zone, the equilibrium determined by the heat undergoes a slight change. A portion of the graphite from the lower strata returns to its combination, and ascending to the surface, disappears, and is replaced in its turn by another. The phenomenon continues until the average composition of the bar corresponds to a certain minimum of carburization of the iron, varied according to the circumstances of the annealing process.

A proportion of manganese, even below 5-1,000 gradually arrests the softening process until it ceases altogether. The pig, of course, continues to lose carbon by oxidation, almost as much in fact as when it is pure, but the manganese resists the production of graphite and retains it in combination in the metallic mass. The silicon may, to a certain extent, saturate the manganese and drive out the graphite. He finds these explanations based on the following facts, as elicited in the course of his experiments: (1.) Pig iron which is truly malleable always contains graphite; (2.) pig may lose carbon, and yet remain brittle if graphite be not formed, or if the quantity existing before the annealing process be not augmented; (3.) pig may become malleable without losing a sensible portion of its total carbon, the annealing being effected by the medium of coal, the co-operation of an oxidizing agent not being indispensable to the softening process; (4.) if silicon be added to a manganiferous pig the metal is improved by annealing.

Hollow Steel Shafting.

Hollow steel shafting is quite a new idea, and seems to be coming into quite extensive use in England. Specimens shown at the recent Manchester (Eng.) Exchange are said to have created quite a sensation among the iron and steel men. A large iron firm in Pittsburgh, Penn., have experimented some in this direction, and are now prepared to make this a specialty. In a recent communication to the *American Manufacturer*, they say:

"Casting hollow steel ingots for shafting and pipes will be one of our specialties in our new Bessemer plant, and we claim, and think we can prove, that we were the first to cast hollow steel shafts and pipes which could be rolled as other steel or iron is rolled.

"We will, within a few days, cast a steel pipe 16 ft. long, 14 inches diameter outside, and 10 inches inside, weighing 4,500 lbs., which could easily be rolled to 40 ft. in length.

"Nearly two years ago we tried to interest two of our largest pipe manufacturing firms in rolling steel pipes, but without success."

"We will run our new plant on heavy castings, and shaped steel ingots for channels, beams, angles, hollow shafts, and any work which cannot easily be shaped with rolls.

"We intend to pay particular attention to making these special steel ingots of low or high carbon, of ordinary Bessemer or of refined Bessemer, made under our own patents."

**THE REESE FUSING DISK**, to which quite full allusion has been made in these columns, seems to have attracted considerable attention in England, and one party, at least, has undertaken some experiments to determine its practical utility. The results of those experiments, with illustrations, were furnished to *London Engineering*, from which journal they were copied into the *Scientific American*. The conclusions were anything but favorable to the practical value of the invention. In a subsequent number of the *Scientific American*, the inventor, Mr. Reese, appears with a communication, in which he says: "I have written *Engineering* that the statements made in the article are so astonishing, and the work exhibited is so radically different from any that I have ever seen produced by the fusing disk, that I think the gentlemen who furnished the article and cuts and made the statements contained in the article have made a mistake, and I asked for their address that I might give them attention first." Mr. Reese further reiterates what he has heretofore said and claimed in regard to his invention, and expresses his willingness to explain and maintain his theory, and cheerfully accept the result of the discussion, whatever that may be.

**AN ELECTRIC SOLDERING IRON.**—Mr. Ball, of Philadelphia, has patented a soldering-iron capable of melting the hardest solders, as those of gold and silver, by electricity. The electrodes pass through and project beyond the handle, and are connected with a ball of platinum; this, when battery connection is complete, becomes heated to any required degree, and the desired soldering is readily effected.

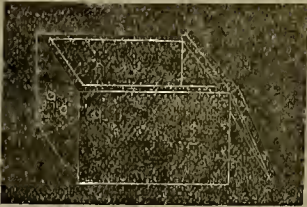
**A NEW STEAM BOILER.**—A new form of steam boiler, invented by Mons. Bernard, has been tested on a French vessel with such satisfactory results that the naval authorities in France have directed a careful examination of it, with a view to its adoption for war steamers. It is shaped like a gasometer receiver, and its chief advantage over other boilers is said to be superior economy in the consumption of fuel.

SCIENTIFIC PROGRESS.

Phenomenon Presented by Vortex-Rings.

Our readers are all familiar with the peculiar appearance of vortex-rings, as they frequently result from the discharge of cannon or from the sudden discharge of steam through an open top locomotive stack. Professor A. E. Dolbear, of Tufts's college, Mass., has been making a careful study of the peculiar phenomenon, connected with these rings, and to facilitate his study has improvised a very simple apparatus for their production, which may easily be constructed by any person who may be interested in this curious study. We copy from *Science*:

1. If one vortex-ring strikes another vortex-ring upon the edge the two rings will bound away from each other as though they were solid elastic bodies, each one vibrating as it recedes.
2. If one vortex-ring overtakes another ring, both moving in the same straight line, and both are of the same size, then the forward one will expand in diameter, and the latter will contract in diameter and will go through the forward one, when each will return to its original dimension. At the same time the forward one will have its velocity retarded while the other will have its velocity increased, and it may overtake the forward one and go through it.
3. If a vortex-ring passes near any light object, as, for instance, a silk thread suspended, or better still a small cloud of smoke or ammonium chloride dust, the latter will be seen to be apparently repelled from the front of it, but attracted and drawn into the ring from the rear.
4. If a vortex-ring be projected parallel with any surface, and at not too great a distance from the surface, the ring will move in a curved path toward it and strike it.
5. If two vortex-rings are projected so as to start in parallel lines near to each other, they



will approach each other until they touch, when they may be either broken or else bound away from each other as in the first case above.

6. If two vortex-rings having the same rate of rotation be started in lines parallel to each other, and at not too great a distance apart, they will not only approach each other, but they will combine to form one ring, which continues to move in the same direction.

7. The combination is effected by the breaking of each at the point of contact, and the welding of the opposite parts of each ring to form one ring with twice the diameter.

8. These rings may in like manner be combined into one.

9. The structure of the vortex-ring is concentric, that is, a cross section of a ring generally shows a series of several concentric circles, with a hollow center. The middle of the ring appears to be a cylindrical unoccupied space.

As experimental work with such rings is very entertaining, as well as suggestive of the behavior of the real atoms of matter, it may be well to give the simple instructions necessary to perfect success.

Provide a cubical box with dimensions about a foot each way, having a swinging back frame, over which is stretched a piece of stout cotton cloth. On the opposite side, two or more inches may be bored two inches apart. Pour some strong hydrochloric acid into one saucer, and some strong ammonia water into another. Set the two into the box, and shut down the door. The box will at once be filled with the white fumes, and a tap with the finger upon the cloth back, will send out well formed rings.

The phenomena one to five, can best be seen by employing only one of the holes, so as to form but a single ring. By striking the cloth a little harder the second time than the first, the second ring may be made to overtake the first, and if it is desirable to exhibit the rings to a room full of people, there should be but a single hole in front, and that one about three inches in diameter; the rings can then be projected with force enough to make them go 10 or 15 ft. from the box.

The other phenomena can best be studied by using only small holes, and tapping gently. The rings will come together within a few inches of the box. It seems to be essential that the two rings that combine, should have the same rate of rotation, a matter easily secured by forming the two at once in the above described way, but well nigh impossible, if one is formed after the other.

It is sufficient now to remark that the new phenomena described above, stimulate in a very striking way, what we call gravitation and chemism.

ON HIS FOURTH HUNDRED.—Mr. Edison took out his 301st patent on the 12th of March.

Photosphonic Discoveries.

At the meeting of the National Academy of Sciences, April 21, Prof. A. Graham Bell read an important paper describing at great length the recent investigations made by Mr. Tainter and himself in the field so brilliantly opened by them a year ago. After referring to their earlier observations on the production of sound by radiant energy, Prof. Bell said that at his suggestion and during his absence in Europe, Mr. Tainter had pursued the investigation of the sonorance of matter under the influence of radiant energy, employing a vast number of substances inclosed in test tubes in a simple empirical search for loud effects. He was thus led gradually to the discovery that cotton-wool, worsted, silk, and fibrous materials generally, produced much louder sounds than hard rigid bodies like crystals or diaphragms, such as had hitherto been used.

Mr. Tainter next collected silks and worsteds of different colors, and speedily found that the darkest shades produced the best effects. Black worsted especially gave an extremely loud sound. As white cotton wool had proved itself equal, if not superior, to any other white fibrous material before tried, he was anxious to obtain colored specimens for comparison. Not having any at hand, however, he tried the effect of darkening some cotton wool with lamp-black. Such a marked re-enforcement resulted that he was induced to try lampblack alone. About a teaspoonful of lampblack was placed in a test tube and exposed to an intermittent beam of sunlight. The sound produced was much louder than any heard before. Upon smoking a piece of plate glass and holding it in the intermittent beam, with the lampblack surface toward the sun, the sound produced was loud enough to be heard, with attention, in any part of the room. With the lampblack surface turned from the sun the sound was much feebler.

**ENEMIES OF SPIDERS.**—The well known naturalist, the Rev. H. E. McCook of Philadelphia, has been talking to the academy of that city on spiders, which he designated as the most benevolent of insects. Among the principal enemies of the spider he enumerated many of those hymenopterous or four-winged flies, the bees, wasps, etc., which produce flesh-eating grubs. Large numbers of spiders are used by these species as food. The nest of one of these forms was exhibited, built of clay in such a manner as to resemble the pipes of Pan. When opened these nests were found filled with spiders of different species. They were all paralyzed by the fly, but not killed, and in this state of suspended animation they remain until the hatching out of the grubs, which eagerly devour them one after the other. The unfortunate captives lie limp in the jaws of the grubs, showing no signs of sensation, and making no resistance whatever. Other flies, and among those, may be included the common black house-fly, prey upon spiders by destroying the cocoons, or by sucking the contents of their eggs when they happen to be uncovered or only slightly protected. The eggs are also devoured in large numbers by birds. Some species of birds assist in preventing the spread of spiders by making use of their webs, especially the thicker portion used in the construction of cocoons, to build their nests. A nest was exhibited, composed of this mineral in such quantity as to indicate the destruction of a great many webs. Those hymenopterous insects which deposit their eggs in the cocoons of the spiders are, however, their most destructive enemies. When the grubs are hatched they attack the eggs and young of their hosts, and consume them as food until sufficiently developed to obtain their nourishment.

**THE RELATION OF THE ATOMS OF CHEMICAL ELEMENTS TO ELECTRICITY.**—Prof. Helmholtz, in his recent Faraday lecture, affirms that the atom of every chemical element is always united with a definite unvarying quantity of electricity. This quantity stands in close connection with the combining power of the atom, or its quantivalence. If the amount of electricity of the monad atom be taken as the unit, that of the dyad is two, that of the triad three, etc. Prof. Helmholtz says: "If we conclude from the facts that every unit of affinity of every atom is charged always with one equivalent either of positive or negative electricity, they can form compounds, being electrically neutral, only if every unit charged positively unite under the influence of a mighty electric attraction with another unit charged negatively. This ought to produce compounds in which every unit of affinity of every atom is connected with one—and only with one—other unit of another atom. This is, indeed, the modern chemical theory of quantivalence, comprising all the saturated compounds."

**TO DISTINGUISH AMBER.**—Some of the ways of distinguishing amber from copal are thus given in *La Nature*: "Copal is yellow, of a more or less deep tint, but uniform throughout, and has yellow points like sulphur on its surface. Amber in a fragment of 12 centimeters in length will show a variation in shade. Amber when rubbed will yield a strong aromatic odor; its imitations will not. Amber may be bent after being smeared with tallow and heated; the imitations will not bend. Amber may be cut, sawed, rasped or polished, but cannot be cemented or soldered like copal. The density of amber is 1.09 to 1.11; that of copal is 1.04."



Table of Highest and Lowest Sales in  
S. F. Stock Exchange.

Name of Company.	Week Ending Apr. 23	Week Ending May 5	Week Ending May 12	Week Ending May 19
Alpha.....	44 3.70	44 3.70	44 3.30	44 3.15
Alta.....	3.45 2.80	3.45 2.80	3.30 2.55	3.30
Arden.....	1.40 2.4	1.40 2.4	1.40 2.10	1.80
Albion.....	4.60 2.4	4.60 2.4	4.60 2.30	2.80
Argents.....	50c 45c	40c 35c	50c 40c	30c
Addenda.....	30c 20c	30c 25c	30c 20c	20c
Belcher.....	2.70 2.60	2.30 2.35	2.30 2.35	2.35
Belmont.....	35c 45c	35c 45c	35c 45c	35c
Best & Belcher.....	12 11	12 11	12 10	10
Bullion.....	1.80 1.35	1.55 1.00	1.55 1.00	75c
Butcher.....	30c 20c	30c 20c	30c 20c	20c
Bullion.....	30c 20c	30c 20c	30c 20c	20c
Bodie.....	8 7	6 6	6 6	6
Bentley.....	93c 75c	80c 80c	80c 80c	70c
Bulwer.....	3 2	3 3	3 3	3
Boston.....	25c 20c	25c 20c	25c 20c	20c
Black Hawk.....	25c 20c	25c 20c	25c 20c	20c
Belvidere.....	15c 10c	15c 10c	15c 10c	10c
Booker.....	65c 40c	25c 25c	25c 25c	25c
Calcutta.....	1.10 1.10	1.10 1.10	1.10 1.10	1.10
Challenge.....	1.10 85c	1.05 1.05	1.05 1.05	1.05
Chollar.....	32 2.60	32 2.60	32 2.60	2.60
Confidence.....	1.20 32	3.50 1.10	3.50 1.10	3.50
Con Imperial.....	2.85 2.50	2.70 2.45	2.05 2.45	2.30
Con Virginia.....	2.85 2.60	2.60 2.30	2.60 2.30	2.30
Crown Point.....	2.85 2.60	2.30 2.65	2.30 2.70	2.30
Columbus.....	20c 15c	25c 35c	30c 30c	30c
Concordia.....	1.05 1.05	1.05 1.05	1.05 1.05	1.05
Concordia (Va.).....	35c 30c	40c 20c	80c 25c	25c
Con Pacific.....	1.10 1.10	1.10 1.10	1.10 1.10	1.10
Deheer.....	65c 55c	1 70c	55c 60c	1 75c
Day.....	35 29	35 35	32 35	34
E. M. Diablo.....	1.70 1.15	1.40 1.45	1.15 1.40	1.4
Excelsior.....	2.10 2.05	1.70 1.35	1.80 1.95	1.90
Grand Prize.....	75c 60c	65c 55c	65c 55c	55c
Golden Gate.....	7 6	7 6	7 6	6
Goodshaw.....	75c 60c	65c 55c	65c 55c	55c
Gold & Curry.....	7 6	7 6	7 6	6
Hale & Norcross.....	62 41	62 41	4.40 4.55	4.60
Head Center.....	2 1	2 1	2 1	1
Hessy.....	55c 30c	40c 30c	20c 25c	25c
Independence.....	1.10 70c	1.15 1.1	1.1 1.1	1.1
Justice.....	50c 35c	35c 30c	30c 30c	30c
Jackson.....	2 2	2 2	2 2	2
Jupiter.....	2 2	2 2	2 2	2
Kentuck.....	2 2	2 2	2 2	2
Kossuth.....	20c 15c	15c 10c	15c 10c	10c
Lady Bryan.....	20c 15c	15c 10c	15c 10c	10c
Leviathan.....	15c 10c	10c 10c	10c 10c	10c
Leeds.....	15c 10c	10c 10c	10c 10c	10c
May Belle.....	15c 10c	10c 10c	10c 10c	10c
Nodoc.....	15c 10c	10c 10c	10c 10c	10c
Manhattan.....	15c 10c	10c 10c	10c 10c	10c
Martin White.....	45c 30c	30c 30c	30c 30c	30c
McClinton.....	1.60 1.60	1.60 1.60	1.60 1.60	1.60
Mono.....	93 12	93 12	93 12	103
Mexican.....	6 5	7 5	6 5	5
Mr. Diablo.....	10c 5c	5c 5c	5c 5c	5c
Morning Star.....	10c 5c	5c 5c	5c 5c	5c
Mr. Potosi.....	10c 5c	5c 5c	5c 5c	5c
Neodoc.....	10c 5c	5c 5c	5c 5c	5c
New York.....	10c 5c	5c 5c	5c 5c	5c
Northern Belle.....	10c 5c	5c 5c	5c 5c	5c
North Nostrand.....	10c 5c	5c 5c	5c 5c	5c
Northern Belle.....	10c 5c	5c 5c	5c 5c	5c
Original Keystone.....	3.30 1.80	2.05 1.70	1.95 1.55	1.40
Oro.....	60c 50c	60c 50c	60c 50c	50c
Potosi.....	1.30 92	4 4.15	4.20 3.70	3.30
Queen Bee.....	10c 5c	5c 5c	5c 5c	5c
South Bulwer.....	40c 30c	35c 30c	30c 30c	30c
Savage.....	4 3	4 3	4 3	3
Seg Belcher.....	3 2	3 2	3 2	2
Sierra Nevada.....	12 10	12 10	12 10	10
Silver Hill.....	35c 30c	25c 20c	15c 20c	15c
Silver King.....	33 21	22 21	21 21	21
Succor.....	60c 50c	60c 50c	60c 50c	50c
Summit.....	2 1.70	2.10 1.85	1.95 1.20	1.95
Scorpion.....	30c 25c	30c 25c	30c 25c	25c
Solid Silver.....	30c 25c	30c 25c	30c 25c	25c
South Bodie.....	30c 25c	30c 25c	30c 25c	25c
Standard.....	30c 25c	30c 25c	30c 25c	25c
Syndicate.....	30c 25c	30c 25c	30c 25c	25c
Tioga Con.....	10 8	10 9	8 10	9
Tiptop.....	10 8	10 9	8 10	9
Tuscarora.....	10 8	10 9	8 10	9
Union Con.....	10 8	10 9	8 10	9
Utah.....	10 8	10 9	8 10	9
Ward.....	2 1	2 1	2 1	1
Wells.....	1.40 1.40	1.20 1.20	1.20 1.20	1.20
Yellow Jacket.....	5 4	5 4	4.90 3.60	3.60

## Sales at S. F. Stock Exchange.

Thursday A.M., May 19	245 Union.....	112 112
115 Alpha.....	270 Yellow Jacket.....	423 35
310 Alta.....		
150 Andes.....		
200 B & Belcher.....		
520 Belcher.....		
300 Bullion.....		
210 Benton.....		
425 California.....		
180 Con Virginia.....		
235 Crown Point.....		
1200 Con Imperial.....		
230 Concordia (Va.).....		
150 Curdie.....		
100 Excelsior.....		
220 Gold & Curry.....		
280 Golden Gate.....		
270 Hale & Norcross.....		
510 Justice.....		
100 Julia.....		
130 Lady Wash.....		
335 Mexican.....		
500 New Wells Fargo.....		
335 North Ex. Utah.....		
300 New York.....		
300 Ophir.....		
500 Overman.....		
630 Potosi.....		
400 Sierra.....		
580 Savage.....		
500 Sierra Nevada.....		
370 Scorpion.....		
199 Utah.....		
	AFTERNOON SESSION.	
200 Argenta.....		
125 Albion.....		
200 Addicks.....		
450 Bismark Isle.....		
450 Belmont.....		
270 Black Hawk.....		
200 Bodie.....		
300 Bulwer.....		
200 Day.....		
200 DeWitt.....		
500 Eureka Cou.....		
100 Goodshaw.....		
100 Inpiter.....		
275 Mono.....		
200 Nevada.....		
80 Northern Bille.....		
50 Navajo.....		
20 N Noonday.....		
500 Oro.....		
500 Paris.....		
100 Summit.....		
30 Bodie.....		
100 Syndicate.....		
100 Tiptop.....		
275 Silver King.....		
200 Tiptop.....		
1200 Thos Con.....		
300 University.....		

PATENT COKE, imported by Balfour, Guthrie & Co., from Wales, is used at a number of places here, and in Utah, Nevada and Arizona, the Copper Queen company, in the latter Territory, using it for smelting their ores. The Selby Lead Company, Union Iron Works, Risdon Iron Works and others in this city use only this kind of coke. The importers advertise it for sale in quantities to suit.

Just as we go to press we receive a copy of "Copp's U. S. Mineral Lands," of which we will speak more fully after having examined the book, which is a full and complete one, containing laws, forms, instructions and decisions.

The Day S. M. Co. has now full management and control of the Mendha and Hillsdale mines and the Hillsdale furnace.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

## ASSESSMENTS-STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No. A.M.	LEVIED.	DEB'TQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Belcher S M Co	Nevada	27	75	Apr 12	May 17	Joe Crockett	327 Pine st
Calcedonia M Co	Nevada	35	35	Mar 23	June 23	E. W. Bess	419 California st
Crown Point G & S M Co	Nevada	45	50	Mar 23	Apr 29	Jas Newlands	827 Pine st
Day Silver M Co	Nevada	9	25	Apr 11	May 3	J W Pew	310 Pine st
Derheer Blue Gravel M Co	California	8	10	May 11	June 16	J T Wetzel	522 Montgomery st
Equitable T M Co	California	25	15	Apr 10	July 11	C J Collins	512 Montgomery st
Fresno G M Co	California	2	15	Apr 25	June 1	D Suck	309 Montgomery st
Gold Lead M Co	Nevada	2	10	Apr 15	May 20	D Fraukides	331 Montgomery st
Hale & Norcross M Co	Nevada	69	50	May 10	June 15	J F Lightner	309 Montgomery st
Julia Con M Co	Nevada	15	30	Apr 27	June 24	H A Charles	419 California st
Justice M Co	Nevada	24	25	Mar 25	Apr 22	R E Kelley	419 California st
Kentuck M Co	Nevada	15	30	May 3	June 7	A C Stuart	234 Montgomery st
Lady Washington M Co	Nevada	2	15	Apr 15	May 20	W H Watson	302 Montgomery st
Northern Light M Co	California	7	15	Mar 9	Apr 6	F S Monroe	310 Pine st
Phil Sheridan M Co	Nevada	11	15	Mar 9	May 5	J Milder	328 Montgomery st
Phoenix M Co	Nevada	23	10	Mar 9	June 15	H Loeter	308 California st
Peck M Co	Arizona	3	100	Apr 14	May 23	Chas T Bridge	224 California st
Savage M Co	Nevada	46	50	Apr 4	May 6	E B Holmes	309 Montgomery st
Silver Hill M Co	Nevada	15	25	May 7	June 10	W B Deau	309 Montgomery st
Sierra Nevada S M Co	California	68	10	Apr 25	May 9	W H Parker	309 Montgomery st
Tioga Con M Co	California	13	15	May 11	June 17	W H Lett	309 Montgomery st
University G M Co	California	8	10	Apr 6	May 12	Wm Lett Oliver	328 Montgomery st
Yellow Jacket S M Co	Nevada	4	100	May 9	June 4	Mercer Otley	Gold Hill

## OTHER COMPANIES-NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No. A.M.	LEVIED.	DEB'TQ'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Boston Con M Co	California	1	30	Apr 26	May 1	F E Luty	330 Pine st
Brooklyn Con M Co	California	1	05	Feb 21	Apr 23	M T McGeehegan	313 Pine st
Butte Creek H M Co	California	7	10	Apr 21	May 26	R L Taylor	230 Montgomery st
Con Imperial H Co	Nevada	15	10	Apr 13	May 15	W B Dean	309 Montgomery st
Day S M Co	Nevada	9	20	Apr 16	May 23	J W Pew	310 Pine st
Golden Gate Con H M Co	California	4	50	Mar 26	May 3	M T McGeehegan	313 Pine st
Inwa M Co	Nevada	13	06	Apr 23	May 30	Chas C Leavitt	411 California st
Independence M Co	Nevada	7	25	Apr 5	May 9	E M Hall	327 Pine st
Lady Washington Con M Co	Nevada	2	10	Apr 22	May 26	W H Watson	302 Montgomery st
Lord M Co	Nevada	2	10	Apr 22	May 26	A B Paul	323 Montgomery st
Lord of Lorn G M Co	California	1	15	Apr 19	May 31	R N Van Brunt	318 Pine st
Mammoth M Co	California	8	25	Apr 13	May 7	A W Rose Jr	302 Montgomery st
May Flower G M Co	California	11	15	Apr 12	May 18	J E Morizo	323 Montgomery st
Montezuma Tunnel M Co	California	4	25	Mar 19	Apr 2	T E Luty	330 Pine st
McMillan S M Co	Arizona	3	25	Jan 12	Apr 29	J Morizo	323 Montgomery st
Montezuma Tunnel M Co	Nevada	9	25	Mar 19	Apr 29	J Morizo	323 Montgomery st
North Standard G & S M Co	California	1	15	Apr 25	May 13	E A Holmes	313 Pine st
Paradise Valley M Co	Nevada	2	10	Apr 25	May 13	C V Dyer Hubbard	318 Pine st
Prospect G & S M Co	Nevada	8	10	Apr 26	May 31	Wm Lett Oliver	328 Montgomery st
Rocky Point M Co	California	7	5	Mar 19	Apr 25	H P Bush	431 California st
Real Del Monte M Co	California	15	50	Mar 23	May 2	W G Hughes	330 Pine st
Red Hill Hydraulic M Co	California	15	10	Apr 25	May 2	C Van Hubbard	330 Pine st
Swamp Angel G M Co	California	3	05	Apr 19	May 20	Lewis Lillie	607 Washington st
Swansea M Co	California	2	05	Apr 5	May 14	M A Wheeler	302 Sansome st
San Pedro M Co	Arizona	1	05	Feb 6	May 26	Henry Deas	309 Montgomery st
Silver City M Co	Nevada	3	15	Mar 2	June 27	A K Durbrow	309 Montgomery st
Tuscarora M & M Co	Nevada	8	15	Apr 2	May 9	M R Sperring	309 Montgomery st
Union Gravel M Co	California	17	50	May 7	June 15	H Pichoir	320 Sansome st

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Cashier M Co	—	D B Chisholm	327 Pine st	Annual	June 7
Excelsior Deep Gravel M Co	California	D B Chisholm	327 Pine st	Annual	June 7
Equitable Tunnel M Co	—	Chas J Collins	512 Montgomery st	Annual	May 27
Pioneer Con M Co	Nevada	J M Buffington	309 California st	Stockholders	May 23
Tyho Con M Co	Nevada	W W Parrish	313 Pine st	Annual	June 1

## LATEST DIVIDENDS-WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W W Taylor	37 Nevada Block	50	May 14
Father De Smet M Co	Dakota	H Deane	New York	50	May 1
Northern Belle & M Co	Cal	Wm Willis	309 Montgomery st	50	May 10
Silver King M Co	Arizona	J Nash	315 California st	25	May 10
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	May 2
Eastern M Co	California	C S Curtis	309 Montgomery st	25	May 9
Navajo M Co	Nevada	E M Hall	327 Pine st	25	May 25

## The Mining Share Market.

The stock market is rather quiet, as is the news from the mines. Our tables give the fluctuations in price. The most interesting thing which has occurred in stock circles is the dismissal of the Burke bonanza suits, by Burke's consent. One Chrystal, however, objected, and the lawyers were called upon to show cause why the dismissal of the suits should not be set aside, on the ground of fraud and collusion. Chrystal's lawyer said that Mr. Burke, as a one fifty-four hundredth part of a legality (the Consolidated Virginia M. Co.), had no more right to make terms with Mr. Flood for the dismissal of three half-won suits than any other owner of 100 shares of Consolidated Virginia. Mr. Burke, said counsel, has never claimed that one dollar nor one cent was due him. How, then, did they arrive at a basis of settlement? Mr. Van Ness supported his position by numerous authorities, and spoke for two hours. Burke has commenced another action for \$12,000,000 against the Bonanza firm, and Chrystal has commenced one to recover \$32,000,000.

News from the Comstock, dated the 18th, is as follows: The water at the Jacket is out to within twenty ft. of 2700-ft. level. All the pumps are doing good work.

The section of heavy pipe for the east half of the hydraulic pump of the Combination shaft failed to arrive to-day. The west pump is now running smoothly six strokes per minute.

The Union shaft is seven ft. below the 2700-ft. level, and rock is growing softer and blasting better.

Work at the Sierra Nevada is still preparatory, and consists of cutting drains, repairing car-tracks and putting in turn-tables.

## Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Northern Belle, May 14, \$13,124.92; Bodie, May 16, \$7,293; Northern Belle, May 11, \$8,079; Eureka Con., May 12, \$3,690; from Pioche for week ending 14, \$4,249; Star Co., May 7, \$7,588; Teacup, May 10, \$2,700; Christy, May 9, \$2,936; Rebellion, May 9, \$1,893; Ontario, May 9, \$5,212; Ontario, May 11, \$4,880; Germania, May 9, \$2,730; Germania, May 10, \$1,710; Tintic, May 9, \$2,891; Horn Silver, May 11, \$7,500; Rebellion, May 11, \$2,511; Hanauer, May 10, \$1,710; Ontario, May 12, \$5,495; Horn Silver, May 10, \$5,000; Germania, May 10, \$1,600; Christy, May 10, \$1,332; Ontario, May 14, \$1,900; Nevada, May 14, \$1,950; Alice, May 12, \$21,536; Hanauer, May 14, \$1,900.



has been made for them, the books have never been found. Those books are in Picche and will be brought to light at the proper time.



### California Jaunts and Resorts.

Many of our readers may remember Black's charming story of the "Adventures of a Phaeton," in which the author takes his hero and heroines through the length and breadth of England, and describes in a very pleasant way the scenery they saw on the road. The dimensions of the State of California preclude the possibility of a trip which will include the whole scope of the State, unless more than one summer should be consumed. But, as there is no finer country in the world for summer excursions and camping out than this, a jaunt over a portion of it will suffice for most persons. One can, moreover, choose the kind of scenery he prefers, and, to a great extent, the climate also. The moist, cool atmospheres of the coast, the warmer and drier air of the mountains, or the heat of the valley, present a variety difficult to find elsewhere in this same area.

In summer we do not need, in our excursions, to count on rainy days. It never rains here during what is known as the "dry season." One can sleep in the open air or in tents for six or seven months in the year without inconvenience.

Tourists are somewhat apt to think that after they have seen Yosemite, Lake Tahoe, the Geysers, the Big Trees and a few more of the "sights" of the State they have seen it all. But there are many beautiful spots in California which lie off the route of travel, which are worthy of a visit. The number of "Springs," and other health resorts, has increased greatly of late; and there are now numerous camping grounds, where those who prefer camping out to hotel life will find all the necessary conveniences.

Going south from San Francisco on the peninsula there is a pleasant road from San Mateo over the hills, by Crystal springs, to Spanish town and Purissima creek, noted for the finest trout in the State, as they are perfectly pure, the creek falling over the cliffs into the ocean. Further on is San Gregorio creek, with its lagoon famous for fishing. There is a hotel here. Then we come to Pescadero, a coast town much frequented in summer and noted for its "pebble beach." The Pescadero and Butano creeks near by afford fine sport for the angler. Beyond that is Scott's valley, and then Santa Cruz, the well-known watering place. Between Purissima and Santa Cruz there are numerous creeks other than those mentioned, with plenty of fine hunting and fishing. Camping grounds will be found all along at many points.

Another trip, starting from this city, is to go by the railroad by way of San Mateo, Redwood City, Menlo Park, etc., to Santa Clara and San Jose, the beautiful towns in the Santa Clara valley. From the first, one may branch off to the foothills of the Santa Cruz mountains, where he will find Blackberry farm, Congress springs, and Los Gatos. From San Jose one may go to the famous Almaden quicksilver mines, and in the opposite direction, a beautiful ride is out to Alum rock, on Penitencia creek, and from there up to the summit of Mt. Hamilton, where the Lick observatory is being built. From San Jose, the S. P. R. R. carries its passengers down the valley past Gilroy (from where one may go to the Gilroy hot springs), through the San Juan pass into the Pajaro valley, and across to the noted watering-place of Monterey, where the railroad company has erected a magnificent hotel. There is the beautiful Bay of Monterey with its splendid beach running around from Monterey to Santa Cruz. At various points on the line of the beach are hotels, camping grounds, and various accommodations for tourists and campers. Aptos and Soquel are the most prominent points.

Back of Santa Cruz the range of mountains of that name offers a splendid opportunity for camping, fishing and hunting, and there are numerous public resorts and springs, such as Magnetite springs, Wrights' and others. The climate in the vicinity in summer is beautiful, and the mountains usually filled with campers.

Following on down the coast, we strike back through the Salinas valley to Soledad, and from here may visit the Pajaro springs, seven miles distant. Then continuing on down the valley again we meet the plateau on which is Paso Robles springs, a noted health resort. Then further on we arrive at San Luis Obispo, an old Spanish town surrounded by grain fields and sheep and cattle ranges. Between there and Santa Barbara these ranges prevail. Santa Barbara is on the coast and is usually reached by steamer and not by the route we have mentioned, which is the way one would have to go by wagon.

To see the coast and its towns below Monterey, the best way to do is to take one of the Pacific Coast Steamship Co.'s steamers and go as far as San Diego and back. In this way Santa Barbara may be visited conveniently. You can also stop at Los Angeles, and by lying over a trip, visit Santa Monica, the orange groves of Los Angeles, and vineyards of Anaheim.

Back from the coast is the charming city of Los Angeles, with its lovely environment. Beyond is San Gabriel valley, with the famous Sierra Madre Villa, popular far and near. By rail eastward one reaches the valley of the Santa Ana, and sees Riverside, a horticultural jewel, with the Glenwood cottages in the midst of orange groves. Beyond is the beautiful San Bernardino valley with the lovely Crafon retreat at its head, the Arrowhead springs,

with their medicinal waters and enchanting traditions, and Waterman's hot springs, which have wide fame but are not now open except for transient visitation.

Returning to the coast one may take the steamer and see San Diego with its magnificent harbor and splendid climate. Returning, as the steamer comes up it passes through the Santa Barbara channel, between the islands and mainland, and coasting along up, finally enters the historic portal of California—the widely-famed Golden Gate.

Starting again from San Francisco, as a center, going north along the coast, we visit Sausalito and San Rafael, and back of them Mt. Tamalpais, and borne by the North Pacific coast narrow-gauge road we pass through a beautiful country, up along the shores of Tomales bay, passing on the way Paper-mill creek, Taylorville, and many beautiful camping spots; then on through the redwood timber to Duncan's Mills and the Russian river, famous for its beautiful scenery.

Then again, by a route ending at the same place one may go by the S. F. & N. P. R. R., to Donahue, Petaluma, Santa Rosa (where you leave for Mark West springs), to Healdsburg, on the Russian river. From here Litton springs, Skaggs springs, the world-famous Geysers, etc., may be visited.

A beautiful trip is up through the fine vineyards of the Napa valley, where are hosts of summer resorts. In this county many pleasant summering places are established in the neighborhood of Napa City, St. Helena, Calistoga, Kellogg and other places. Among the well-known resorts are the Napa Soda springs, Litton springs, Nook farm, Sulphur springs at Calistoga, Etna springs near Pope valley, Sulphur Springs ranch near Knoxville, and Petrified Forest.

Entering Lake county from the west, the Highland springs, reached via the Blue lakes by stage from the railroad station at Cloverdale. Entering the county from the south, by stage from Calistoga, the traveler passes Mt. St. Helena, and can take a magnificent view from the summit by tarrying at the Mt. Toll House, and takes a short horse-back ride. Anderson springs, Harbin springs, Glenbrook, Adams' springs, Seiger springs, Howard springs, Soda Bay, on Clear lake, Sulphur banks and Borax lake, Mound cottage, Bartlett springs are among the notable attractions of Lake county. Lake county seems admirably and wonderfully adapted for a universal tourists' field, and is some day destined to attain a world-wide reputation.

Shasta county from the well watered bottom lands of the upper Sacramento valley up to the refreshing Strawberry valley at the base of Mt. Shasta, some 70 miles or more, is a pathway full of joy to the hardy tourists who delight in rugged walks of nature. The United States fish hatching establishment on McCloud river and Soda springs, clear fishing brooks and rivers, good fishing, etc., are here met with.

In Contra Costa county, the view from the summit of Mt. Diablo, in a clear day, is grand and wonderful in the number of cities and towns embraced in the vast extent of populated territory brought within the scope of the tourist's vision. At Byron, in this county, are hot sulphur springs which are lately becoming quite noted. The Piedmont springs in Alameda county, back of Oakland; the hay baths at Alameda; the sulphur springs in Colusa county, the White Sulphur springs near Vallejo, in Solano county; Wahler lake, Donner lake and hosts of other attractions might be mentioned.

The whole range of the Sierras, which extends the length of the State, abounds in magnificent scenery. It would take more than a page of our space simply to mention the points of interest. At different points in the range and the foothills hydraulic and quartz mining are carried on extensively, and those who have never seen the former should visit at least one gravel mine while in California.

It is of course impossible, in a brief article to enumerate all the pleasure and health resorts of California or all the thousand and one places where people go to amuse themselves in the summer months. We shall in future issues of this journal take occasion to mention other than those spoken of here. Every little canyon and glen, every mountain valley, every nook has its picturesque points, known to a chosen few. Here and there are places more widely famed. The vineyard regions of one section, the orange orchards of another, the wheat fields of another, possess charms to allure people of different temperaments. Others again prefer the solitude of the hills, where the unbroken forests reign supreme, where they can retire for a time from the hush of scenes of life.

In illustration of the grand rush of emigration from Europe to this country, a New York telegram furnishes the following startling statistics: The arrivals at Castle Garden during April were 60,000, about 1,400 in excess of the immigration during April of last year, and upwards of 4,000 in excess of that of May last, when 55,083 were recorded. This is the heaviest monthly immigration in the history of the port. From the 1st of January to date the total is about 105,000, or 25,000 more than were reported during the first four months of 1880. The steamship companies say they are advised by their agents in Europe that the exodus from there will be even greater in the coming month from all the North German and Scandinavian ports, and arrangements to put on extra vessels to provide needed accommodations have been made accordingly.

### The Placer Mines of the Klamath and Trinity Rivers.

Among the richest of the good paying placers of '49 and '53 were those of the Klamath and Trinity rivers. And while they are still worked with considerable profit by some of the modern methods, yet they are not operated to the extent which their real merit and worth would warrant, nor have they kept pace, in fact have fallen far behind, those of localities that are more easily approached. The first stages of placer mining passed with the pan and rocker with us as it did in other sections, with the introduction of improved methods, still, even with this we have seemingly kept in a kind of a rut which prevents any material progress in this industry, and thus the mining industry has languished for many years in this section referred to. Whatever may have been the amount and number of fortunes taken in gold dust from the Klamath and Trinity rivers, it is scarcely more than a mere prospect of what is still in deposit, awaiting the development of enterprising capital and engineering science. There are very many claims, particularly on the Klamath and Lower Trinity rivers, that are being held by parties who know well enough their value and perhaps the proper way to open them, but who, feeling unable or indisposed to take the risk, are "talking it easy," and, like Micawber, "waiting for something to turn up." That these mines have not kept pace with other sections is not owing to any doubt as to the wealth or availability of this deposit, for in this the well-developed quartz ledge offers no greater certainty, but it is due to three things, namely: 1st, their apparent isolation; 2d, lack of capital; 3d, want of engineering knowledge and business capacity. In speaking of the idea of isolation we emphasize the word "apparent," because we think that all there is of it. It is true that they cannot be nearly approached by railroad, but the principal provisions required are cheap, and the country is amply able to produce what will be required of it. Capital has not been seeking investment in this apparent isolation, because of the lethargy and almost oblivion that rests upon the country. Those who occupy it have made little or no attempt to let these possessions be known to the world, except in a few individual cases; no general or public means have been employed to advertise or throw the mines upon the mining market. But what we consider of equal, if not greater, importance than these, is the need of engineering experience and judgment, the capacity to plan and execute, the ability to calculate costs, results and effects. There are many of the benches, bars, and even the bed of the river itself, that will yield certain and rich returns, and do not require the outlay of very large capital, if directed by those having both practical and scientific knowledge. We have before suggested that the golden wealth in the beach sand was an incentive for inventive genius to perfect some machine to save the gold. This suggestion is in every way applicable to the high benches of the Klamath and Trinity. There are hundreds of them that are rich, but lack water. At their base runs the river with water in any amount inexhaustible, and in whose current is power enough to force this water to any reasonable altitude. He who shall invent a method of harnessing that power to the end of raising the waters of the Klamath on to the high benches along its course can command any fortune he chooses. And when the speed of the Klamath river is considered (for it is a rapid river), it really seems to be a feasible and practicable matter, and its accomplishment would be far less wonderful than the telegraph or the telephone. Of late some attention has been turned toward these neglected mining grounds by persons having the means to carry out necessary work. Some investments have already been made, and others are discussing the subject.—*Democratic Standard.*

### Mining Altitudes.

A good deal of nonsense is being indulged in by cotemporaries about the altitude at which mines, and especially silver mines, are found; and one paragraph, evidently started by a man from the Louisiana lowlands, says that "scientific men have proved by actual measurements that most of the great silver mines lie 10,000 ft. above the present sea level, and among the richest are some 2,000 ft. higher still." Joh. of the land of Uz, who was doubtless better versed in geology, mineralogy, metallurgy and practical mining than many of the editors who keep the above quotations afloat, said: "Surely, there is a vein for the silver, and a place for the gold, where they fine (refine and purify) it." Rich mines have been found as high as 16,000 ft., and many of them as much as 10,000 ft. above the level of the sea; but it does not follow that silver mines are found only at such altitudes. The highest croppings of the famous Comstock are considerably less than 8,000. The Eberhardt, of White Pine, Nevada, which was the richest silver mine in the known world, is barely 9,000 ft. above the sea level. The Carthaginian mines of antiquity, which at one time employed 40,000 operatives, were scarcely 5,000 ft. high, and the rich mines of Tombstone, Arizona, do not attain even so great an altitude. In all the broad mineral region of Nevada no paying vein of silver ore has been found at an altitude of 10,000 ft. It does not follow even that, because veins of silver are usually found in the older

rocks of lofty mountain ranges, they may not also be found in the sandstones and other sedimentary rocks of the valleys, as in the case of the vast rich regions of Silver Reef, Utah. The speculation as to the "altitudes of mines" is all nonsense, for "surely there is a vein for the silver," and that vein is as likely, all other conditions being favorable, to be at an altitude of 4,000 ft. or less, as at one of 10,000 ft.—*Bodie Free Press.*

### Raising Water from Mines.

A cheap, simple, and useful elevator for mines, which it is thought may in some cases obviate the use of the forms of elevator now generally adopted, has been suggested by Mr. G. Day, of Neath, who states that for mines steam is objectionable in any way, as it condenses and also makes the places where it is employed unbearably hot; and compressed air though useful in many ways yet nevertheless involves expensive compressing machinery, and is a more or less constant source of trouble in the mine on account of its producing such cold in the cylinders of the engines it drives that ordinary lubricants are little or no use, and glycerine has generally to be used; the moisture also is sometime turned into ice. In general form the apparatus is somewhat like a steam injector, but the motive power is water, not steam; and while the vacuum in the steam injector is formed partly by condensation in his it is formed entirely by the velocity of the small stream of water. The elevator consists mainly in a body provided internally with two nozzles, one the discharging nozzle, a fixture, and the other through which the head water flows, either adjustable by means of a hand-wheel and screw or their equivalent, or a fixture like the first, according to the requirements of the case. One form is thus constructed—about the center (lengthwise) of the body is a branch, through which the head or pressure water flows into one enlarged portion or chamber in the body, through which chamber in the direction of the length of the body passes the adjustable nozzle, being hollow, and pierced with suitable holes or openings for the free passage of the water within the chamber to enter. A little further along the body is another branch and chamber forming the intake for the water which is to be removed or raised, and the adjustable nozzle fits sufficiently tight into the intervening space to stop the passage of water between it and the body, though still free to move as needed; packing can be used for this purpose if found desirable. The second chamber terminates in the discharge nozzle which is arranged in any convenient manner, but preferably in a line with the central axis of the body. The action of this elevator is that when the head waters enters the first branch and chamber, it passes through the space into the inside of the adjustable nozzle, and passes out by its orifice (which is preferably contracted) into the discharge nozzle with great velocity, thereby producing a vacuum into which the water to be removed rushes, and is driven out through the discharge nozzle with the head water. The relative areas of the nozzles may be varied to suit circumstances.

A simple form of elevator consists of a short body provided with the two branches, chambers and discharge nozzle as before, but instead of being adjustable by hand-wheel or otherwise, the internal or supply nozzle is fixed (preferably screwed) into the body at or near the bottom of the first chamber projecting into the second chamber, as in the case of the movable one, a suitable cap closing the top of the first chamber. The action is the same as in the former case. A third form has the discharge nozzle, second branch, and chamber, and also the fixed supply nozzle as before, but instead of the first branch being upon the side of the body as in the previous cases, it is attached to the top of the body either beyond the chamber or in place of it, and the head water enters the supply nozzle direct, the supply branch being straight or curved in any convenient direction. In all cases he prefers to taper the discharge nozzle, the smaller area being at the second chamber and the large area beyond it at the end of the body. These elevators can be made of various materials and in various ways; he prefers to cast them in iron or brass, and to screw the different parts together; in working they may be placed vertically, or in fact in almost any position.—*London Mining Journal.*

**SOUTH MOUNTAIN.**—We learn that arrangements are being made to resume operations at South Mountain. A Salt Lake gentleman, named E. Carruthers, who has had much experience with smelting ores, arrived here yesterday, on his way to the South Mountain mines, with the intention of starting work. We believe a Boston company has purchased the property, but of this we are not certain. South Mountain produced considerable base bullion some years ago, and every freight train returning from Idaho was loaded with bars of the metal. For some reason operations were suspended and never resumed. It was at one time thought that South Mountain would rival Eureka in the richness and extent of its mines.—*Silver State.*

**A CHANCE FOR INVENTORS.**—A Lake Superior exchange says: "The copper miners of Lake Superior are greatly interested in securing a perfect machine for the reduction of a certain coarse sand made in their stamp mills. The opening in this direction for mechanical skill and ingenuity is a good one."



# Note on the Estimation of Copper in Speise.

Read before the American Institute of Mining Engineers, by F. C. BLAKE, Mansfield Valley, Pa.

The best method for the estimation of copper in ore and secondary products is that proposed by Dr. Steinbeck for the award offered by the Mansfeldscher Ober-Berg- und Hutten-Direktion. It is based upon the decolorization of the blue ammonia solution of copper by potassium cyanide. It is necessary for this accurate estimation of copper in arsenides that the arsenic be separated from the copper before the ammonia solution is made. The presence of a notable amount of arsenic renders the titration by potassium cyanide inaccurate, the end reaction being obscured by the appearance of a yellowish-green tint towards the end of the titration. The change of the color of this ammonia solution from blue to the tint caused by the presence of arsenic cannot be used for an end reaction for the intensity and quick appearance of the latter color depend upon the amount of arsenic present in the solution.

In the analysis of speise, the method of separating the copper by an oxidizing and reducing treatment in the mufla, to volatilize the arsenic, gives poor results, and there may easily be some loss of this weighed sample. This separation of the precipitated sulphides of arsenic and copper by treating with acetic sulphide, gives good results, but this process is tedious.

I have used the two following methods, which are simpler and more expeditious than those mentioned, with good results.

A. The weighed sample of speise is heated first with sulphuric acid (concentrated acid diluted with about an equal portion of water), which will not usually effect complete solution; sufficient concentrated nitric acid is then added to produce complete decomposition of the speise. This solution is then evaporated for half an hour or a little longer after fumes of sulphuric acid appear, then diluted with water and the copper precipitated by metallic zinc for re-solution; or, if comparative results only are needed, the acid solution is treated directly with ammoniac hydrate. The amount of arsenic present in the final ammonia solution will not be sufficient to interfere with the titration by potassium cyanide.

B. The weighed sample is fused in a porcelain crucible with potassic or sodic bisulphate until completely decomposed. The fused mass is then dissolved in hot water. The solution will contain too little arsenic to affect the end reaction in the ammonia solution.

This method is simpler than the use of sulphuric and nitric acids for solution, but careful watching is required during the process of fusion to avoid loss.

I give the following results of analyses of speise:

	I.	II.	III.
Separation by sodic sulphide.	17.2	12.3	7.95 percent Cu.
" " method A.	17.0	12.1	7.89 " " "
" " " B.	16.9	12.2	" " " "

From another sample of speise I obtained results as follows: Method A, evaporation continued 45 minutes after the appearance of sulphuric acid fumes—5.7% Cu. Method A, evaporation continued but a few minutes after sulphuric acid fumes were first given off—5.1% Cu. By evaporation with hydrochloric instead of sulphuric acid, 5.2% Cu. was obtained. In the last two examples the arsenic was not completely removed and titration was made as closely as possible to the appearance of the characteristic color due to arsenic.

## Prospecting Companies.

A correspondent of the Salt Lake Tribune says: Let me suggest a scheme to some of the enterprising merchants of Salt Lake, who are, more than any other class of citizens, interested in the development of the mines of Utah. Let them form prospecting companies for the purpose of developing prospects. Let there be, say 200,000 shares, half of which may be kept as a working capital, the remainder to be subscribed for by the stockholders in such lots as each may be willing to pay his assessment on. Then purchase a number of prospects and develop them. The result will be that one or two of the number will prove valuable, and assessments would cease, as the working stock would command a sale. There is scarcely the possibility of a failure, if the matter is properly managed, and work prosecuted with vigor. The reason that there is not 20 splendidly paying mines here is because prospectors need help to develop their claims. The mines are here, and will sooner or later be found. Such an organization would benefit the Territory vastly, by the developments it would make. If we wish our mines developed let the men who will derive benefit therefrom aid in the work. There is no reason why there should not be half a dozen such companies. Only be careful to have them composed of men who have means, and who will not want to sell out the moment there is an assessment. The prospector must daily assess himself and take his chances; and when he does find a good claim he is often too poor to open it up, and must sell it for little or nothing, while every other person in the Territory shares in the result.

GOLD-BEARING quartz has been discovered near Fond du Lac, Wis., and a company of Boston capitalists will work the ledge.

## USEFUL INFORMATION.

### Velocities of Wood-Cutting Tools, &c.

Circular-saw teeth, 6,000 to 9,000 ft. per minute; band-saw teeth, hand feed, 3,000 ft. per minute; band-saw teeth, power feed, 4,000 ft. per minute; gang saws, 20-inch stroke, 120 strokes per minute; scroll or jig saws, 800 to 1,500 strokes per minute; planing and moulding cutters, 5,000 ft. per minute; shaping and carving cutters, 6,000 revolutions per minute; Daniel's planer cutters, 8,000 ft. per minute; machine augurs, 1½-inch diameter, 900 revolutions; 2-inch diameter, 1,200 revolutions; 4-inch diameter, 1,800 revolutions; rod end dowel machines, 1-inch and under, 3,000 revolutions; 2-inches and over, 2,000 revolutions; mortising machines, heavy work, 350 strokes per minute; mortising machines, light work, 700 strokes per minute; tenoning cutters, 2,500 revolutions per minute; emery wheels, 6-inch diameter, 3,200 revolutions; 12-inch diameter, 1,600; other sizes in proportion; main shaft for wood-shops, 350 revolutions per minute.

It is quite a common error to give too great a speed to saw teeth. They should not scrape, but cut out the kerf, and all should work evenly. With a moderate speed, the cutting edges and throats being in good order, the greatest useful effect will be obtained from a given amount of power, and the teeth will be most readily kept in order.

COMPRESSED MOTHER-OF-PEARL.—M. Davochel has invented a compressed kind of nautilus shell, solidified with gelatine. Thus prepared it will serve for inlaying or mounting in cabinet work, cartonnage, tablettes, and other industries, and the manufacture of fans, buttons, etc. This product can be figured, stamped, molded by pressure, poured out in the liquid state, and, in fact, takes every kind of form desired. It can be dyed in any color, polished and varnished by the processes used for tortoise-shell, mother-of-pearl, and other analogous substances. To render the shells thin and friable, they are submitted to a strong heat, which separates them into thin scales; these are then pressed in the cylinders of a flattening roller, and afterwards pounded in a mortar. It is then sifted to get rid of the dust, and the powder is treated with gelatine, and shaped into any form required.

WOOL EXTRACTING.—For separating wool from cotton from mixed goods (wool extracting), M. Paul Poulin, of Paris, has patented the employment of the two following solutions in which the goods are immersed: First, chloride of calcium at 20° Ba., 4 volumes; water, 3 volumes. The chloride of calcium at 20° Ba. is itself prepared by dissolving in a mixture of 1 volume of muriatic acid at 22° Ba., and 2 volumes of water, enough chalk to saturate it; or, second, solution of 1 lb. of salt and 1 lb. muriatic acid in ½ gal. of water. This solution is kept boiling by means of steam for 30 or 40 minutes; then cooled and poured on the goods under pressure. The rags are washed and dried, the residue is pure wool.

SOLDERING FLUID.—A soldering fluid which does not occasion rust is prepared in the following manner: Small pieces of zinc are immersed in muriatic acid, and left in it until the acid is saturated with it, which may be known by the cessation of ebullition of the acid, and also by the zinc added after that stage being left undissolved; add spirits of ammonia, about one-third of the quantity of this acid; thin with a little quantity of rain water. When, at the time of adding this zinc, the muriatic acid is heated to a low degree, the solving of the zinc will be achieved sooner. This fluid does not cause rust on iron or steel, and is excellent for all purposes, even for tinning.

DYEING BLACK.—Four ounces copperas and one ounce logwood extract to each pound of goods; dissolve the copperas in water sufficient to cover the goods; wet them in clean water before putting them in copperas water, to prevent spotting; boil them in the copperas water about 20 minutes; take them out, rinse in clear water first, then wash in soap-suds till it seems soft as before it was put in the copperas water; then put into the logwood dye and let it boil about 20 minutes; take out and let it dry; wash before it dries, or after, as is most convenient; it will neither crack, fade, nor grow rusty.

INSTANTANEOUS SILVERING MIXTURE.—To coat copper or brass objects with silver without difficulty or loss of time, the following process is given: Mix 3 parts of chloride of silver with 20 parts of powdered cream of tartar and 15 parts of powdered common salt. Moisten a suitable quantity of the mixture with water, and rub it with a piece of blotting paper upon the metallic object, which must be thoroughly clean. The latter is afterward rubbed with a piece of cotton upon which precipitated chalk is dusted, then washed with water, and polished with a dry cloth.

REMOVING STAINS FROM MARBLE.—To remove stains from statuary marble, take equal parts of fresh oil of vitrol and lemon juice; shake up these substances very thoroughly in a bottle; wet the spots with the mixture, and in a few minutes afterward rub with a soft linen cloth, and the spots will be found to have entirely disappeared.

CAUSES OF EXPLOSION.—At a recent meeting of the Polytechnic Club of the American Institute, Mr. Allen questioned whether the laboratory experiments frequently mentioned to account for boiler explosions were fair equivalents to the conditions of actual practice. From the very nature of the settings, there can be no electrical reason for explosions. It is interesting to note that some years since Mr. Barnett Le Van made some experiments at Philadelphia, which would settle the question in regard to the effects of low water. A boiler was blown off under heavy pressure and the plates made red-hot, water was then sprayed into this boiler upon the plates; the pressure fell instantly and the boiler leaked. This should end the hot-plate and low water theories, especially as we find, in most instances, bad enough workmanship to account for all the explosions which happen.

TO RESTORE BLACK MERINO.—Soak the goods in strong soft-soap suds two hours, then, having dissolved one ounce of extract logwood (which is the amount required for one dress) in a bowl of warm water, add sufficient warm—not hot—water to cover the goods, which are to be taken from the suds without wringing. Allow the goods to stand in the logwood water over night; in the morning rinse in several waters without wringing; in the last water add one pint of sweet milk, which stiffens the goods a little; iron while quite damp. It will not crack, and looks like new.

ARTIFICIAL INDIGO.—One of the most interesting and promising industrial discoveries made during the past year was that of Prof. Bayer of an artificial coloring substance as a substitute for vegetable indigo. This new product is gradually coming into use in England, and, according to the *Textile Manufacturer*, bids fair to soon become a formidable rival to the vegetable product.

VARNISH ON METAL SURFACES.—To make alcoholic lacquers or varnishes adhere more completely to polished metal surfaces, one part boric acid should be added to 200 parts of varnish. This composition will adhere so firmly and become so completely glazed as to be removed only with difficulty. Be careful not to add too much of this boric acid, as it injures the gloss in that case.

## GOOD HEALTH.

### The Organ of Voice.

The larynx is the organ of voice, and is placed at the upper part of the air passage. It is situated between the trachea below and the base of the tongue above, and forms that visible projection in the middle part of the neck known as *Adam's apple*. Its form is that of a triangular box—narrow below and broad above. It is composed of nine different cartilages, bound together by ligaments and moved by numerous muscles. Below the larynx stretches the windpipe, passing down into the lungs and subdividing like the branches of a tree into the right and left bronchi.

The laryngoscope enables us to look down into the larynx and watch its many movements. The image we see in the mirror differs materially from anything else we meet with in our anatomical studies. The epiglottis occupies the highest part of the laryngeal image. Its free border may be watched, alternately rising and falling during the examination. It presents a scroll-like form, and in the middle we see the under surface turned up like a lip. The vocal cords are the next most prominent objects in the image. They stretch from the front to the back of the larynx and are to be seen as two smooth, white bands, standing out in remarkable contrast to the surrounding red structures, alternately approaching and receding from each other as the patient breathes. These two moving hands once seen will never be forgotten. Right here permit the remark that Laryngology has done many wonderful things in detecting and remedying the defects and diseases of the human voice. Light has been thrown into dark places; slight changes have been readily diagnosed; tumors, ulcerations and abrasions are seen at a glance, and thus every appliance of science is brought to the aid of the most beautiful and fascinating specialty in the whole domain of medicine and surgery. As the statue of Memnon is said to have grown vocal when touched by the first beams of the morning sun, even so has the voice of the dumb broken forth into songs of thanksgiving when set free by this skillful hand of our God-given art!

As the skin covers the body on the outside, so the mucous membrane lines it in the inside, and under certain circumstances they become readily transformed into each other. "This is only a single instance of the marvelous handiwork of Nature, and one may well stand in awe and in wonder when he contemplates the Divine wisdom which has fashioned such an exquisitely fitting garment, woven without seam, adapted by a hundred variations to every office it has to fulfill, covering the body outside and lining it inside, winding at every turn through the intricate labyrinth and inclosing within its folds this strange machinery of life." We not only trace the finger of God upon this stone tables of the earth, the letters and the law of its everlasting form, but we see it in every line and movement of this wonderful human frame of ours!—*Sanitary News*.

## Tobacco Smoke.

In further research on this subject Dr. Le Bon finds that collidine, the new alkaloid existing in tobacco smoke, with other aromatic principles, and prussic acid, as well as nicotine, is a liquid of agreeable and very penetrating odor, and as poisonous as nicotine, the twentieth part of one drop sufficient to paralyze and kill a frog. It is this prussic acid and various aromatic principles that cause headache, giddiness and nausea in smoking certain tobaccos that contain little nicotine. Other tobaccos, rich in nicotine, have no such effects. This tobacco contains most prussic acid and collidine are those of Havana and the Levant. The dark semi-liquid matter which condenses in pipes and cigar-holders contains all the substances just named, as well as carbonate of ammonia, tarry and coloring matters, etc. It is very poisonous. Two or three drops of it will kill a small animal. The combustion of tobacco destroys but a small part of the nicotine, and most of this appears in the smoke. The proportion absorbed by smokers varies according to circumstances, but hardly ever falls below 50 centigrammes per 100 grammes of tobacco burnt. About the same quantity of ammonia is absorbed at the same time. Naturally, more of the poisonous principles are absorbed where the smoke is breathed (as in a room); less in the open air. A frog placed in a receiver containing a solution of nicotine, with about one drop of that substance to a little of water, succumbs in a few hours. Tobacco smoke contains about eight milliliters of carbonic oxide per 100 grammes of tobacco burnt. This poisonous properties of tobacco smoke are not due to this gas, as has been maintained in Germany.

THE WILLOW AS A PREVENTIVE OF MALARIA.—Mr. Von Linnep, the Swedish Consul, writes from "Mahazik, near Smyrna," to the *London Times*, as follows: "Before the uncalypnus was ever heard of in Asia Minor, I had seen the bark of the willow used as a febrifuge. I had remarked the easy and inexpensive reproduction of this tree, its quick growth in damp places, its excellent qualities for fuel and for agricultural implements, and its great advantages for strengthening the banks of capricious streams, and had thence taken every opportunity after the winter floods to stick willow cuttings along the banks of streams and in other damp places in my property; also to scatter plane-tree seeds in marshy spots. The result has been that, whereas 20 years ago the full-grown trees in this neighborhood might have been counted, a luxurious growth of willows and plane-trees marks my place, fuel is abundant, fever is steadily decreasing, the malarious propensities of the streams are checked, my neighbors have to come to me for agricultural implements, and I have not had to go for timber for rough purposes." It may be interesting to observe in this connection that the comparatively new but well-known antiseptic preparation known as salicine is derived from the bark of a certain species of this willow. It is of a pure, bitter taste and highly febrifuge in quality. It is largely used in various solutions, in surgical operations, and is the most effectual preventive of putrefaction in the system known.

CURE FOR COLD-FEET SLEEPLESSNESS.—The *British Medical Journal* says this is the plan to adopt with cold feet: They should be dipped in cold water for a brief period; often just immerse them, and no more, is sufficient; and then they should be rubbed with a pair of flesh-gloves, or a rough Turkish towel, till they glow, immediately before getting into bed. After this a hot-water bottle will be successful enough in maintaining the temperature of the feet, though without this preliminary it is impotent to do so. Disagreeable as the plan at first sight may appear, it is efficient; and those who have once fairly tried it continue it, and find that they have put an end to their bad nights and cold feet. Pills, potions, lozenges, "night-caps," all narcotics, fail to enable the sufferer to sleep successfully. Get rid of cold feet, and then sleep will come of itself.

KEROSENE AND SALT FOR DIPHTHERIA.—A correspondent of the *New York Sun* says: In 1862, on a plantation in South Alabama, where there was great difficulty in securing good medical advice, I saw a whole plantation of blacks, as well as the white members of a large family, successfully treated for diphtheria with kerosene and salt, used thus: Every patient was given a lump of rock salt about the size of a boy's marble, and instructed to keep it in his or her mouth, swallowing the salty saliva. At the same time the throat was rubbed with kerosene oil, and a flannel saturated with kerosene kept around the neck until the symptoms were abated or entirely gone. If necessary, mild cathartics were given. Not a case was lost, and there were fully 150 in all on the plantation.

TREATMENT OF FETID PERSPIRATION OF THE FEET.—A correspondent of the *New York Medical Record* writes: "As a recipe for fetid perspiration of the feet seems to be in order, and as I do not remember seeing mentioned one that never failed in my hands, I herewith send it: A 1% watery solution of permanganate of potassa. Bathe the feet at night and morning, oftener if necessary, even to every hour, letting the feet dry after each bath without wiping. A stronger solution may at times be necessary; generally a weaker one will answer. The stronger the solution the greater the discoloration of the feet, but, as it is temporary, patients prefer it to the fetid moisture."



# MINING SCIENTIFIC PRESS

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SAN FRANCISCO:

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## Business Announcements.

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## Passing Events.

We still continue to hear of rich strikes in California mines. The Rainbow quartz mine, in Sierra county, is proving itself fabulously rich. In fact the ledge is one of the richest ever discovered in this State. The *Mountain Messenger* says that last week three men in one day panned out 29 pounds of gold. For many days the yield has been about the same, and there seems yet to be no signs of its giving out. The Rawhide mine, as we stated recently, took out \$75,000 in about 10 days, the mine having been abandoned for some 10 years before the last work was commenced.

Very conflicting reports come from Wood River. Some people are very sanguine; others, again, are despondent. We give in other columns some detailed information about this region.

Arizona still attracts many immigrants, though it is for the moment overshadowed by Idaho. The country is a very rich one, and now that it has a railroad, is making rapid strides in advancement.

The spring now being fairly opened, prospecting has begun in the mountains, and from now on we may expect to hear of numerous strikes by individuals in the army of prospectors now exploring our mineral regions.

The principal item of interest during the past week has been the receipt of a sample of Clipper Gap iron in this city to test. The iron is made with charcoal and presents a very good appearance. Its qualities will soon be determined, the Union Iron Works proprietors being prepared to give it a thorough test. We shall be very glad to hear it turns out well, as we will then be sure of having a good supply of iron within our borders. We shall give the details of the tests when they are completed.

## Lumber and Wages.

About all the lumber mills on the coast streams from this port up to Mendocino City have had to raise the wages of laborers, on account of the scarcity of men. Two years ago they paid from \$30 to \$40. Last year they paid \$35 to \$45. This year they pay \$40 to \$50. These men are also boarded. This rate of wages is for hands in the woods, choppers, "jackscrews," chain tenders, sawyers and swamps. The common roustabouts, such as the swamps and sawyers, get the \$40, and the choppers, "jackscrews" and chain tenders, \$45 and \$50. The common mill hands have also been raised to \$35 and board.

Of course the more skilled get larger wages. Foremen in mills get about \$100, according to their experience, etc. Engineers get \$75; the head sawyer about \$70; or teamsters about \$70. They formerly paid 2½ cts. apiece for sawing ties, 2½ cts. for hewing them, 2½ cts. for splitting, and 2½ cts. for swamping and felling, making about 10 cts. Now they pay 6½ cts. for the sawing and splitting, and 3½ cts. for the hewing. Then there is the swamping and felling. At Caspar they now offer 25 cts. apiece for ties at the landing. Last year they could only get 22 and 23 cts.

The reason of the increase of wages is the scarcity of men. There is a class of men who stay on the coast right along and who do the kind of work referred to. During the past two or three years, while times have been dull, the lumber trade has been dull and many of the mills have either shut down or run on short time. Many of the men have sought other employment or gone away, and the desirable labor is therefore scarce now that the lumber business is reviving and the mills are starting up. The demand for lumber is now increasing and the mills are starting up again.

Beginning at Rockport, south of Mendocino, the mill is running and cutting about 30,000 ft. a day. The Ten Mile River mill is also running and cutting about 30,000 ft. a day. The Noyo mill, we believe, is not running. The Caspar mill, which can cut about 60,000 ft., is cutting about 40,000 ft. a day. The Mendocino mill at Big River, which has a capacity of 60,000 ft. a day, is cutting about 40,000 ft. At Little River, the mill is, we believe, closed down. The Alhion is sawing about 30,000 ft. a day. There are two mills at Salmon creek, one of them now being built by L. E. White. The other is sawing about 30,000 ft. a day. At Navarro river they are doing about the same. The mill at Greenwood creek, Cuffey's Cove, run by A. D. Moore, is sawing between 30,000 and 35,000 ft. a day. The Gualala mill is cutting from 40,000 to 50,000 ft. now. The Duncan mill, which ships by railroad, is, we understand, cutting about 35,000 ft.

The six mills at Humboldt bay, one at Trinidad and two at Crescent City, are not understood affected by the advance in wages. The demand for lumber is now greater than for some three years. The available acreage of Humboldt county redwood lands is figured at 510,000 acres. There are hundreds of thousands of acres of timber lands along the coast yet, which are untouched. Now that business is picking up again, a revival of the lumbering interests of the coast has occurred.

## Gathering Mining Statistics.

Mr. A. W. Lawver, Statistician of the Mint Bureau of the Treasury Department, connected with the branch Mint of this city, has started on a tour to visit certain California mines, so as to make arrangements to more fully obtain information as to the production, and gather such other material as will aid the Director of the Mint in making his report for the fiscal year. Mr. Lawver will go first to Smartsville, then to North Bloomfield, Nevada City, Dutch Flat, Colfax, Auburn, Georgetown, Placerville, El Dorado, Plymouth, Amador City, Sutter Creek, Mokelumne Hill, Murphy, Angels, San Andreas, Sheep Ranch, Sonora, and intermediate points. Other trips will probably be made in other directions.

This work is a very good one, and is really necessary if we are to keep ourselves posted as to the yield of our mines. The gathering and publication of the statistics helps the miners, inasmuch as the result of their work is made known to the world. It must be understood, however, that the yield of the mines is only published in the aggregate, by counties, etc., but in no case is the yield of any one mine made public. Miners, therefore, need not fear to give the yield of their mine to Mr. Lawver, as such matters are not published, but are only used to make up aggregates. The local papers can assist Mr. Lawver by making this point apparent to the miners of their neighborhood.

Mr. Lawver is doing very valuable and intelligent work in his department. He has exercised great care in collecting his statistics, and has been very industrious in getting at proper sources of information. The material gathered will appear in the report of the Director of the Mint, and the statistics, being carefully gathered, will be reliable and correct.

THE Little Chief mining company of Leadville is reported to have \$100,000 in the treasury, and stockholders are expecting a dividend soon.

## Minerals Containing Silver.

Only a small proportion of the large amount of silver which is at the present time produced for commercial purposes is found native, and then not pure, as it is generally alloyed with a little copper, gold, platinum, mercury, arsenic, iron, lead, bismuth or antimony.

Native silver occurs in masses or in arborescent and filiform shapes in veins traversing gneiss, schists, porphyry, and other rocks; it also occurs disseminated in native copper and galena, but usually invisible to the naked eye, therefore requiring the aid of a good microscope to determine its presence.

Silver when pure has a metallic luster. Color and streak, silver white. Ductile. Hardness, 2.5—3. Specific gravity when pure, 10.5. Minerals containing silver are found in veins of nearly all descriptions, and even in sea water minute traces have been found by a careful analysis.

Silver is a metal extensively used in the arts and manufactures, and many products contain more or less proportions.

Silver will be found in the products as well as in the refuse from nearly all lead and copper smelting works, if carefully looked for, and a very small amount can be determined with accuracy. Any mineral or alloy containing what is called a "trace" of silver about one-half ounce to the ton of 2,000 lbs., can be assayed, and the metal extracted and determined with accuracy.

Mr. George Attwood, in his "Practical Blow-pipe Assaying," gives the following list of principal minerals containing silver:

Argentite, silver glance containing 87% silver, with sulphur.

Stephanite, brittle silver ore, containing 63% silver, with sulphur and antimony.

Pronstite, light red silver ore, containing 65.4% silver, with sulphur and arsenic.

Pyrrargyrite, dark red silver ore, containing 59% silver, with sulphur and antimony.

Argentiferous grey copper ore (fahlerz), containing from 5.7% to 18-31.8% silver, with antimony and sulphur.

Argentiferous sulphide of copper, containing 53% silver, with sulphur and copper.

Polybasite, containing 72-94% silver, with copper, sulphur, arsenic and antimony.

Chilenite, containing 86.2%, with bismuth 13.8%.

Bromyrite, containing 57.4% silver, with bromine 42.6%.

Cerargyrite (horn of chloride), containing 75.3%.

Embolite, containing 60—72% silver, with bromine and chlorine.

Sternbergite, containing 33.2% silver, with iron 36%, and sulphur 30%.

Iodyrite, containing 46% silver, with iodine 54%.

Selenic silver, containing 11.6-42.8-65.5% silver, with selenium, copper and lead.

Hessite, containing 62.8% silver, with tellurium 37.2%.

## Geographical Society of the Pacific.

This society is a recent organization, the objects of which are to encourage geographical exploration and discovery; to investigate and disseminate geographical information by discussion, lectures and publications; to establish in this, the chief maritime city of the Western States, for the benefit of commerce, navigation and the industrial and material interests of the Pacific slope, a place where the means will be afforded of obtaining accurate information, not only of the countries bordering on the Pacific ocean, but of every part of the habitable globe; to accumulate a library of the best books on geography, history and statistics; to make a collection of the most recent maps and charts—especially those which relate to the Pacific coast, the islands of the Pacific and the Pacific ocean—and to enter into correspondence with scientific and learned societies whose objects include or sympathize with geography.

The society will publish a bulletin and an annual journal, which will interchange with geographical and other societies. Monthly meetings are to be held, at which original papers will be read or lectures be given; and to which, as well as to the entertainments to distinguished travelers, to the conversations, and to the informal evenings, the fellows of the society will have the privilege of introducing their friends. The initiation fee to the society is \$10; monthly dues \$1; life fellowship, \$100.

At a meeting held at the Palace hotel on the 12th inst., the following gentlemen were elected for the ensuing year: President, Geo. Davidson; Vice-Presidents, Hon. Ogden Hoffman, Wm. Lane Booker, H. B. M. Consul, and John R. Jarboe; Foreign Corresponding Sec., Francis Berton; Home Cor. Sec., James P. Cox; Treas., Gen. C. I. Hutchinson; Sec'y, C. Mitchell Grant, F. R. G. S. The council is composed of the following: Hon. Joseph W. Winans, Hon. J. F. Sullivan, Ralph C. Harrison, A. S. Hallidie, Thos. E. Stevin, F. A. G. S., W. W. Crane, Jr., W. J. Shaw, C. P. Murphy, Thos. Price, Edward L. G. Steele, Gerrit L. Lansing, Joseph D. Redding. The Trustees are Geo. Davidson, Wm. Lane Booker, Hon. Jno. S. Hager, Geo. Chismore, M. D., Selim Franklin.

## The Behring's Straits Currents.

It will be remembered that a short time since, we mentioned the fact that W. H. Dall, of the U. S. Coast Survey, who has passed a number of years in Alaskan waters, on Coast Survey duty, denied the existence of any branch of the Kuro-Shiwo, or Japanese warm stream, in Behring's straits. That is, he failed to find evidence of the existence of any such current, although he had made careful observations. At the islands in Behring's straits, his vessel had tailed in opposite directions with ebb and flood tide, and he thought the only currents there were tidal in their nature. The existence or non-existence of this current is an important point in Arctic research on this side of the continent.

At the last meeting of the Academy of Sciences, Prof. Davidson, of the U. S. Coast Survey, author of the "Alaska Coast Pilot," refuted Dr. Dall's opinion of the non-existence of a branch of the Kuro-Shiwo, or Japanese warm stream, from the north Pacific into the Arctic ocean, through Behring's strait. He said that in 1857 he gave to the Academy his own observations, and recently he had conferred with Capt. C. L. Hooper, who commanded the U. S. steamer, *Thomas Corwin*, employed as a revenue steam-cruiser in the Arctic and around the coast of Alaska. Capt. Hooper confirms the opinions of all previous navigators, every one of which, except Dr. Dall, say that a branch of this warm stream passed northward into the Arctic through Behring's strait. It is partly deflected by St. Lawrence island, and closely follows the coast on the Alaskan side, while a cold current comes out south, past East cape in Siberia, skirting the Asiatic shore past Kamshatka, and thence continues down the coast of China. He said ice often extended several miles seaward, from East cape on the Asiatic side of Behring's strait, making what seamen call a false cape, and indicating cold water, while no such formation makes off on the American side, where the water is 12 degrees warmer than on the Asiatic shore off the Diomed islands, situated in the middle of Behring's strait, the current varies in intensity according to the wind.

Frequently it is almost nothing for several days, when after a series of southerly winds the shallow Arctic basin has been filled, under a heavy pressure, with an unusual volume of water, and a sudden change to northerly winds, makes even a small current setting southward for a few days, just as at times the surface currents set out our Golden Gate continuously for 24 and 48 hours, as shown by the United States coast survey tide ganges. Whalers report that the incoming water then flows in, under the temporary out-flowing stream.

Old trees, of a variety known to grow in tropical Japan, are floated into the Arctic basin as far as past Point Barrow, on the American side, but none are found on the Asiatic side, or near Wrangel Land, where a cold stream exists, and ice remains late in the season. On the northern side of the Aleutian islands are found coconut husks and other tropical productions stranded along the beaches. The American coast of Alaska has a much warmer climate than the Asiatic coast of Siberia, and the American timber-line extends very far north. The ice opens early in the season on the American side, and invariably late on the Asiatic.

Capt. C. L. Hooper says that when just north of Behring Strait, off the American coast, in the Arctic basin, the U. S. steamer *Thomas Corwin*, when hauled for 24 hours, drifted 40 miles to the northward. From all these, and other facts, and the unanimous testimony of American whalers, who have for years spent many months annually in the Arctic, and from his own observations, he argued that a branch of the Kuro-Shiwo, or Japanese warm stream, unquestionably runs northward through Behring's strait into the Arctic basin along the northwestern coast of Alaska.

Prof. Davidson then called to mind the testimony in regard to the existence of Plover island, between Herald island and Wrangel land, which he said was first made public through this academy. The evidence of Capt. Williams, Thomas and Long, were recited and highly praised. One of the officers of Admiral Rodgers' expedition climbed to near the top of Herald island, at a time of great refraction, when probably a false horizon existed, and hence did not see Plover island, although Wrangel land was in sight.

Prof. Davidson thinks all the authorities are against Dr. Dall, who attributes the warm current he observed on the American coast, to water from the Yukon river; and to the large expanse of shallow water exposed to the sun's rays. As Dall's observations only covered a few days of possibly exceptional weather, and the whalers, and Captain Hooper's cover vastly longer periods, and whalers all say it is a pretty hard thing to heat southward through Behring's strait, owing to the northerly current setting into the Arctic, we are forced to the conclusion that Dr. Dall has mistaken the exception for the rule, and his conclusions are therefore erroneous. When, in 1824, Wrangel went north, he, like others, always found broken ice and considerable open water. In 1867, when Capt. Thomas Long made his memorable survey of the coast of Wrangel land, the season was an exceptionally open one, and in California we had heavy rains, extending into July.



## Check Assays.

George Attwood, son of Melville Attwood, Esq., of this city, and at one time Superintendent of the famous Emms mine, has recently published a manual of "Practical Blowpipe Assaying," with 74 woodcuts. The work is an effort on the part of the author to record the methods of assaying adapted by himself during 18 years of foreign travel, in hopes that they will assist others who have to make examinations where complete assay offices and laboratories are not to be found. The general system of assaying adopted is a simple and direct one. Sixty-four elements are mentioned in the work, and the assayer may be asked to determine the presence of any one of these. The system being a direct one, directions are laid down for the separate determination of each. For assaying, the author has adopted the system of checking his assays by synthetic assays, or, in other words, preparing an assay with a weighed quantity of the chemically pure metal or element to be determined, and mixing it with materials resembling as nearly as possible those of the ore, alloy or compound to be assayed, and then, after the completion of the assay, adding to the direct assay the loss found to have been incurred in the synthetic.

In the assay of gold and silver alloy a check assay is necessary. In silver assays Mr. Attwood thinks it is absolutely necessary, and by using the same most accurate results may be obtained in silver and gold coins; bars and in-

## Safety on Railways.

There is a certain ratio between the number of passengers carried and the number of accidents to life and limb, on every railroad. But it is found by experience that the danger in traveling does not increase with the number of passengers or frequency of trains, so much as on the amount of freight. The relative safety of most of the chief English lines is well known. For instance, the Lancashire and Yorkshire company pay as compensation for damages £1,200 for every million passengers carried. Others a decreasing amount, until the Metropolitan is reached, and this pays only about £6 for every million passengers carried; yet on the latter the trains are more frequent and greater in number.

This English experience points to a reform there as here. That goods traffic and passenger traffic should be kept separate and distinct; and that freight traffic should be as far as possible carried on at night, when the mail trains are fairly out of the way. This is the conclusion of the *Engineering Times*, which has paid considerable attention to the question.

Each year, however, we find that our railway business increases, yet the number of deaths by accident does not seem to increase in proportion, showing that the increase is not in a constant ratio. It is astonishing how few accidents there are on our crowded roads, where it is considered that the safeguards are so much fewer than in Europe. The cross-

## The Mechanics' Fair.

A meeting of the Sixteenth Industrial Exhibition of the Mechanics' Institute was held on Wednesday evening. Mr. J. H. Culver, the Secretary, who has just returned from a trip East, was present.

Over one hundred applications for space were read and referred to Superintendent Gilmore. Bids for the privilege of keeping a restaurant, ice-cream stands, candy-stands, and publishing a daily newspaper were opened and referred to the proper committee.

The President stated that a number of leading citizens of Oregon had signified their intention of making an exhibit of the products and resources of that State similar to the one made at the Centennial Exposition at Philadelphia in 1876.

Reports were read from different committees. One was to the effect that it was proposed to add a new feature to this fair in the shape of an exhibition of minerals, and the collection would be the finest and most complete ever seen on this coast. Another committee reported that the viticultural and horticultural display would surpass those of any previous year, and it was probable that both departments would be under the management of the respective State Commissions. It is also contemplated to make an entirely radical change in the appearance of the interior of the Pavilion, and the arrangement of the exhibits.

The opening exercises will take place on Tues-

## Blowpipe Fuel.

In using the blowpipe, pure olive oil is the best fuel for reductions and quantitative fusion. Mr. George Attwood, who has had great experience with the blowpipe, says in his "Practical Blowpipe Assaying" that alcohol makes a good fuel for qualitative work, and is especially useful for scorification and cupellation of silver and gold alloys, as well as for heating glass tubes and mattresses, and is employed in the assay of mercury. By adding about one-seventh part of turpentine to alcohol the reducing strength is increased.

Refined rape seed oil answers very well as a blowpipe fuel. The ordinary illuminating gas makes a good fuel, but it is much better for oxidation than for reduction.

The flame of a wax candle, or even the flame of an ordinary candle, answer the purpose when nothing better can be found. Although assays can be made from the flame supplied by candles, yet such assays are generally attended with considerable difficulty, owing to the small volume of the flame.

Paraffine melted and passed into a lamp having an open top and a broad wick attached to one end, answers nearly all the purposes required for blowpipe fuel. The great objection is that soot accumulates on the glass tubes or porcelain vessels when heated over the flame.

In some countries—the interior of South America, for instance—alcohol cannot be procured, except at a great cost; but as crude spirits, made from sugar-cane, etc., are generally



SILVER BAY, BARANOFF ISLAND, ALASKA TERRITORY.

gets can be valued or stamped for market, and found to be correctly assayed by following the method described. The first part of the book treats of the mouth blow-pipe and apparatus; the second part of qualitative determination; the third part of assays of the commoner metals; the fourth part consists of conveniently arranged tables. Mr. Attwood has written a very complete and valuable hand-book, the instruction being very clear and plain. The book is useful to either beginners or more advanced students.

## Alaska Mining Regions.

As considerable attention is now being turned to Alaska as a mining region, we give an engraving on this page from a sketch by Major Bell, which shows the general characteristics of the coast line. The engraving is a representation of Silver Bay, Baranoff Island, which is the island on which Sitka is built. It is named in honor of Baranoff, a Siberian merchant of education, who was the real founder of the settlement of New Archangel, or Sitka. The entire island contains a number of gold-bearing quartz veins. Fourteen miles from Sitka, near the head of Silver Bay, are the works and mines of the Alaska G. & S. M. Co. The territory of Alaska covers an immense tract, and it will probably be many years before it is even partly prospected. Last season many mines were found and no doubt many more will be this year, for a number of prospectors have gone up there prepared to explore.

The climate of the country, in the neighborhood of Sitka, is by no means rigorous. There is some considerable snow, but it never gets very cold. The whole coast is more or less foggy and considerable snow falls. The great difficulty about prospecting is the heavy thick timber which comes to the water's edge. For this reason hundreds of miles of the coast have never been examined. It will not be very long, however, before thorough search will be made all along the coast and back into the interior, for gold, silver and coal mines.

WHITE RIVER arastras, Tulare county, are making returns of \$7 or \$8 a piece per day.

ings are not guarded here and the trains do not slow up. The local road doing the largest business in this vicinity is that running through Oakland and Alameda. There are some millions of passengers carried each year, yet very few persons are hurt when the amount of traffic is considered. There is no freight traffic on this part of the road, and, if the English experience applies here, that may be a reason. However, it is a fact that notwithstanding the constantly running trains from 5 A. M. to 12 midnight through the streets of two populous cities the accidents each year number much fewer than one would be disposed to estimate.

## Irrigation and Wells.

There is a noticeable feature of irrigation worthy of study and investigation for the benefit of the near future, now developing in our irrigating districts. On the dry plain lands of Fresno county, in places where wells had to be sunk from 35 to 60 ft., after irrigating a portion for several seasons, it is found that surface water is obtainable in from 5 to 8 ft. The water surface in wells at Sheep Camps, 10 miles or more from irrigation, is found to be several ft. higher than a year or two ago. What does this argue? Does it not foretell that if all the dry land should be once flooded and thoroughly irrigated, say during the seasons of the year when waste waters are over abundant, would not thereafter one half the supply heretofore estimated as necessary for irrigation be ample? We should be glad to have readers of the *RURAL* send us facts bearing on this subject, together with their opinions on the matter.

At the Eisen vineyard formerly it required 65 ft. to reach surface water; now, only 6 ft. On the Central California colony, at Mr. Marks' place, a well 35 ft. deep, as at first required, now has water about six ft. from the top; and seven miles west of this colony, a well six ft. deep now has water rising to within two ft. of the surface. On the Temperance colony, 47 ft. depth was at first required; now the water in some places comes within dipping distance.

One result has been to cause the boring and piping of artesian pumping wells to lower strata for a better and healthier supply of water.

day, August 2d. The orator has not yet been determined upon.

A report from the Secretary of the Institute shows that the net profit derived from the first eight fairs given by the Institute, including the sale of the building in which they were held, was \$88,860.30; and from the last seven fairs, all of which have been held in the building on the corner of Mission and Eighth streets, the net profit paid to the Institute was \$72,674.18, besides paying for the exhibition building and contents, now the property of the Institute, which cost \$106,230.61, thus showing a grand total of \$267,865.09 as the result of the previous fairs held under the auspices of the Institute. The managers state that nothing will be left undone to make this, the last fair to be held in the present pavilion, the most attractive of all the exhibitions yet given, and the public is promised many novelties which will be both pleasing and instructive.

## Guiding Attachment for Headers.

W. H. Keen, of Woodbridge, exhibited at the Lodi meeting his combined lever and tiller or header guider for which he secured a patent last year. He tested the apparatus in his own heading during the harvest of 1880, and cut, himself, 375 acres toward the last of the season, the guider enabling him to do the work with great ease and success. The design of the guider may be briefly described as follows:

This invention contemplates forming a peculiar jack-staff, carrying the caster guide-wheel below, and arranged above as a guide for the cutter-bar level, the whole being in front of the driver, so that a seat may be provided at the rear end of the beam, upon which the driver may sit during his work. The tiller for steering the header is swiveled on the rear end of the cutter-bar level, and so combined with it as to serve also as a means of raising or lowering said level. It further consists in forming in a peculiar manner an automatically movable fulcrum for the cutter-bar lever, to keep the header on an equal balance, so that the cutter-bar is raised with little friction, and the strain relieved from the links connecting the cutter-bar frame with the pole carrying the guide-wheel and driver.

Mr. Keen expects to give his device full test this year and introduce it for the use of the public next season.

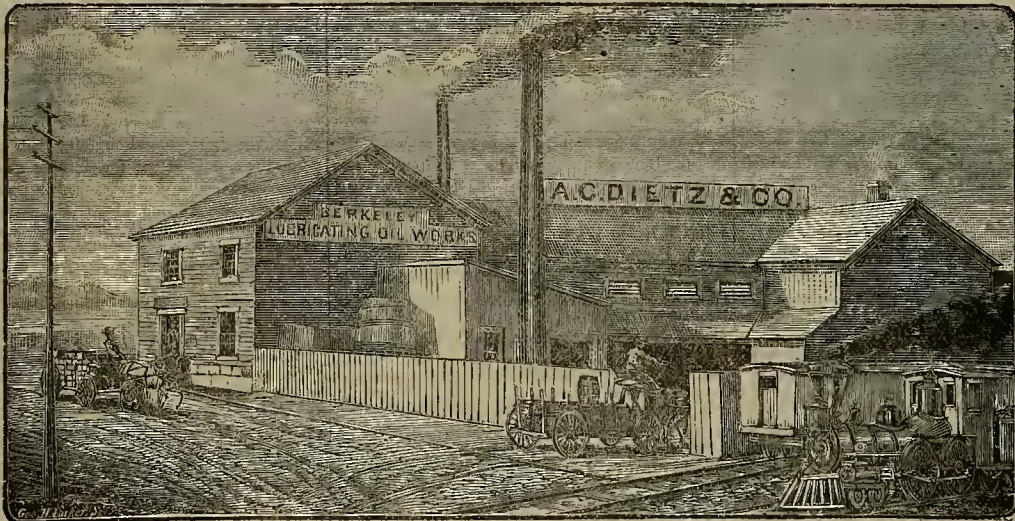
plentiful in such places, they afford the explorer a good substitute for alcohol, as well as oil, owing to the presence of more carbon than pure alcohol contains. The spirits, however, contain some water; and after the fuel is about half consumed it is best to empty the lamp and fill again with fresh spirits.

## The Bamboo.

Now that different varieties of the bamboo are growing well in California soil and interest in the plant is general, items of the great usefulness of the plant abroad are valuable. We have had many such before, but testimony from a well-known Californian who has just returned from Asiatic travel is pertinent. Hon. Irving M. Scott, of this city, has been delivering lectures before the Mechanics' Institute on his observations abroad, and in one of these lectures is the following concerning the bamboo: One of the features of Japan is the use they make of bamboo. I do not know of anything that would be more valuable to California, or any climate where it would grow, than this one article of bamboo. If I can recall the uses to which I saw it put I will give them to you. If you see a Japanese ship or a small boat—a schooner or a yacht, as we would call them—you will see that the masts are of bamboo; the yards are of bamboo; the sails are of bamboo; the ropes are of bamboo, and the poles with which she scuds along or comes up to the wharf are of bamboo. The captain's slippers are made of bamboo, and the carpet in the captain's room is made of bamboo. His drinking cup may be of bamboo, and many of the ornaments are large stalks of bamboo, carved. They use it for scaffolding to build their houses. They make their partitions in all their modern houses with a net-work of bamboo, on which they fix their plaster, in place of laths, as we do. They use it for clothing, for pipe stems. They pipe their hot and cold water in bamboo pipes; they make strings, toys and fans of bamboo, and bamboo makes the handsomest grove that we saw in our travels—slender and straight, and its foliage was as feathery as it is possible to conceive. Inside of the castle at Kioto, the finest grove said to exist in the world, we saw.



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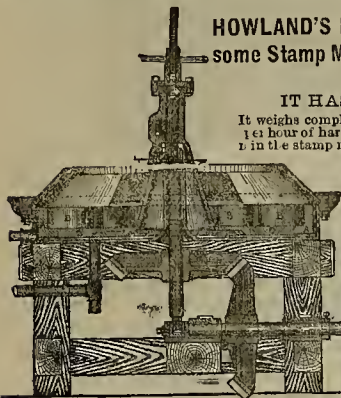
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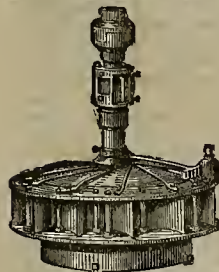
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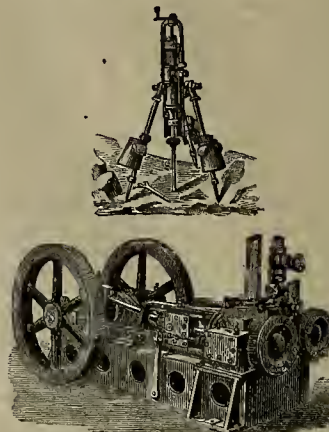
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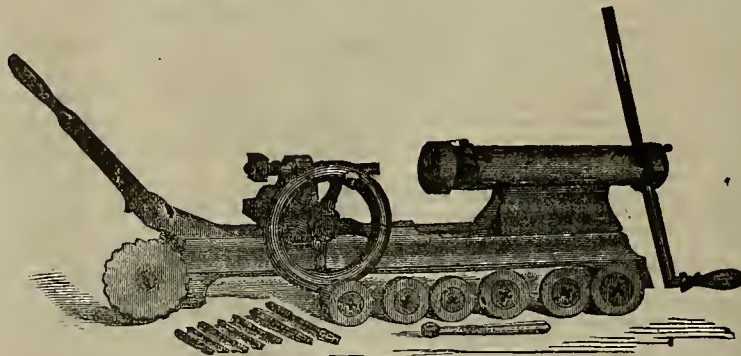
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING MAY 20, 1881.

240,953.—ANIMAL SHEARS.—J. J. Bogard, Tehama, Cal.  
240,963.—GATE.—A. P. Campton, Rohnerville, Cal.  
241,032.—PIPE MACHINE.—R. Layng, S. F.  
241,044.—CARBON TRAMWAY.—S. R. Mathewson, S. F.  
341,041.—HARVESTER.—D. C. Mattheson, Stockton, Cal.  
341,071.—BAG.—F. Roehner, Oakland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Recent Decisions Relating to Patents, etc.

We give below brief abstracts of decisions rendered upon patent cases in litigation, for the benefit of our readers:

#### DECISIONS OF THE U. S. COURTS.

##### Potter et al. vs. Stewart.

U. S. Circuit Court, Southern District of New York. Decided January 22, 1881. Blatchford, J.

1. It is of no consequence that a re-issue states that certain combinations are found in the machine which will act in a certain way and effect certain results, when the original did not state that such combinations were found there, or failed to state that said modes of operation and said results would follow, provided the said combinations in fact existed in a machine made according to the drawings and descriptions in the original patent, or provided the said modes of operation and the said results in fact followed in a machine so made. To supply such defects is the very object and effect of a re-issue.

2. A combination claim may be infringed, although the specific devices used by the defendant were not known at the time of the patentee's invention.

3. Any improvement in an element of a combination which does not effect its manner of co-operation with the remaining devices, will not serve to avoid the charge of infringement.

##### Crouch, Appellant, vs. Roemer.

Supreme Court of the U. S. Decided October term, 1880. Appeal from the Circuit Court for the District of New Jersey. Chief Justice Waite delivered the opinion of the Court.

Shawl straps with handles attached to a leather cross-piece having loops at the ends being old, it is no invention to stiffen, by artificial means, the leather cross-piece, which had before been made as rigid as it could be by thickness, doubling and stitching. The use of known equivalents for some of the elements of form or structure, to make them somewhat better, is not invention.

##### Waring, Jr., vs. Johnson.

U. S. Circuit Court, Southern District of New York. Decided February 4, 1881. Blatchford, J.

1. Re-issue of Letters Patent No. 8,199, granted G. Waring, Jr., April 23, 1878, held to be valid.

2. When an invention is claimed as "the combination, in a check book, of checks and stubs" of substantially the same size, so united that two checks lie between only two stub-pieces, substantially as specified and set forth, it is immaterial, in view of the state of the art, whether the defendant's book has the line of perforation between the check and stub-leaf at the top or bottom of the stub-leaf, or at the leaf end of the check.

3. It will not invalidate the re-issue that the claim is broader than the claim of the original patent, provided that it is "for the same invention" shown and described in the specification and drawings.

\* More complete reports of the proceedings may be found on file in the office of the MINING AND SCIENTIFIC PRESS Patent Agency, 202 Sansome street, S. F.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**WHEEL.**—Ira H. Bradebaw, San Leandro, Cal. Dated May 10, 1881. No. 241,284. This improvement is particularly adapted to the construction of wheels which are used upon mowing and reaping machines, headers and heavy agricultural machinery. It consists in a novel construction of a wheel having a hub in which the spokes-sockets are formed alternately upon each side of a central disk, or flange, whereby the bases of the alternate spokes are entirely separated from each other, while their outer ends connect with the rim on line with each other. This leaves efficient space so that the spokes may be all made of a certain size and need not be tapered to fit the sockets. The sockets have flanges projected from one side to grasp the edge of the spoke to hold it. In combination with these sockets the inventor employs two exterior disks, one of which is formed on the box in which the axle turns. This box extends through a central hole in the spoke-socket portion of the hub, and the opposite flange slips over its end, being either screwed on or bolted through to the opposite disk, so that the two are drawn closely against the side of the spoke-sockets, which they close on the outer sides. The whole construction is simple, light and cheap, as the hollow shell forming the spoke-sockets and the box and flanges are easily cast, and the spokes themselves may be completed in the form of long bars, or twisted by machinery, and then sawed to the proper lengths and put into their places without further fitting.

**ROLLER SKATES.**—Wm. Akin, S. F. Dated May 10, 1881. No. 241,270. This invention relates to certain improvements in roller skates of that class in which the roller frames are supported upon axles which stand at angle to a horizontal plane, so that when the foot-stand is turned to one side, the rollers upon that side will be cramped, or drawn nearer together, and the skate will thus be caused to run on a curve.

The roller frame is so constituted that a single roller may be used at each end of the skate, and entirely surrounded or inclosed by its frame; and ball-and-socket joints are formed, upon which the roller frame turns, to give the angle by which the skate is caused to run in a curve. The socket next the foot-stand is deeply concave, so that the ball stands as high as possible, which is of great advantage, as it gives the roller a greater throw to each side and greater facility in turning. The rubber or other elastic returning spring is fitted upon the shank of the ball-joint and sets in the concave below the head or ball. It is regulated so as to give greater or less stiffness of action by means of a screw at the opposite end of the roller frame, and by which it is compressed or slackened. The rollers are made broad, and by the method of construction the whole frame is greatly strengthened.

**FILTERING FAUCET.**—W. M. Sack, Oakland, Alameda county, Cal. Dated May 10, 1881. No. 241,427. This invention relates to a filtering faucet, in which a peculiar construction and arrangement of the faucet render it self-cleaning. The object is to provide a self-cleaning filter faucet, to avoid the necessity of taking the filter out. A filter is placed in the faucet, and is so arranged that by turning the cock in reverse positions the water is passed first down and then up through the filter, the latter being thus cleaned at each reversal of the water.

**AYERLL MIXED PAINT.**—It would hardly seem that the simple idea of preparing ready-mixed paint for general sale would create such a revolution in the use of paints as it has done. Before the Ayerll mixed paint came on the market, people had to buy lead, oil, color and driers, separate and mix the paint themselves. As this required skill, few attempted it, but hired painters to do the work. Now, however, any small job of painting can be done by mixing a quantity to suit of Ayerll paint, which is ready mixed and prepared for use in any color. It is also purchased in large quantities by consumers who get a paint of uniform grade of excellence. This pioneer in mixed paints is improved by pure linseed oil, pure white lead, pure zinc and the best colors for tinting, which, by the patented process of manufacture, are united to produce a paint which is at once beautiful and durable. The "soluble glass" uniting the oil and pigments, the whole mass dries with a hard, rich, glossy appearance; and it will not chalk or peel off. The paint can be scrubbed or washed as occasion requires, when its freshness will be renewed. At this office of the general agent for the Pacific coast, O. S. Orrick, 403 Market street, we recently had occasion to note the great variety of colors and tints in which this paint is now mixed. Every possible shade is prepared, and it is put up in large or small packages, so one can procure the exact quantity required, without loss from waste.

**ATOMIC WEIGHT** is the weight of the atom of an element as compounded with that of the atom of another element, ascertained from the proportions by weight in which they combine; or, leaving out of view the hypothetical idea of an atom, it is the number expressing the proportions by weight in which the elements combine—one of the elements, either hydrogen or oxygen, being assumed as the unit for comparison with the others. Oxygen and hydrogen combine to form water in the ratio of 1 hydrogen to 8 of oxygen; and 1 and 8 are therefore the combining proportions of hydrogen and oxygen—also called, to avoid hypothesis, their combining equivalents.

**WASHINGTON COLLEGE.**—The examination of the classes in Washington college, Alameda county, Cal., will take place on Monday, Tuesday and Wednesday, May 23d, 24th and 25th, commencing at 9 o'clock each morning. The last hour of Monday and Tuesday will be devoted to declamations, reading of compositions, and to music. Wednesday afternoon, from 1 to 4 o'clock, there will be declamations, reading of essays, vocal and instrumental music under the direction of Profs. Toepke and Brandau. The graduating exercises will be held on Wednesday evening, May 25th, commencing at 7:30 o'clock. The friends of the institution, and of education generally, are cordially invited to attend all the above exercises.

**COMPLETE HARVESTERS.**—Mr. W. J. Little, of Stockton, will have in operation this year five or more of his new harvesters, upon which he has lately added important improvements. They vary in size, according to width of cut, from 16 to 24 ft. Mr. Atwater, of Merced, last year cut and threshed an average of 50 acres per day with this machine in average grain, and will run two of the machines this year. Mr. Ostrander, of Merced, and Mr. Kohl, of Placerville, will use the Little harvester this year for the second season. Mr. Little has important improvements this year, and his harvesting apparatus is worthy the attention of wheat growers.

**JAS. H. MILLER,** Tucson, A. T., wishes to learn the whereabouts of Alphonso Miller and sister, who were in Marysville, Cal., in 1866.

In Sierra county the Howland Flat mine is paying regular dividends to its Scotch owners.

### Mining Items.

THE different mines in Cave Creek, 30 miles northeast of Phoenix, are being developed rapidly and showing well.

THE Tiptop mine, 40 miles north of Phoenix, has turned out, with a 10-stamp mill, over \$100,000 in the last two months.

CHINESE wood choppers in Montana have been driven out of the woods by white men, mostly Frenchmen.

Flow of water at the mouth of the Sutro tunnel is 4,342,896 gallons in 24 hours. Temperature of the water is 120°.

JOHN POLGLASE, late underground foreman at the Idaho mine, has been presented with a handsome cane by his brother miners.

THERE is not a mining company in operation in Pioche, but there has been \$60,000 worth of bullion extracted from the chloride ores taken from the mines in less than two months.

It is stated that the Union Con. mine, of Cerro Gordo, Inyo Co., together with the furnaces, has been leased by San Francisco parties, and that work will soon be commenced on this property.

RICH placers have been discovered a few miles east of Vulture City, Arizona, paying from \$40 to \$50 per day. Numbers are rushing to the new El Dorado. Vulture City is 60 miles northwest of Phoenix, and in the direction of the Vulture mine and 80-stamp mill. So says a dispatch.

AT Angels camp a new feature in hydraulic mining has been introduced. It is the electric light, which so illuminates the whole field of operations as to enable the work to proceed at night with all the safety and carefulness which attends it by sunlight. Considerable mining is opening up here. Men are prospecting and arastras are running in many places.

THE Yreka creek mining enterprise, in Oregon, one of great magnitude, is likely to prove a failure, from various causes. A great amount of money has been expended in it by capitalists of San Francisco and elsewhere, and, if this is the case, the loss must be heavy. Last winter's storms almost destroyed a great portion of the large ditch, and other misfortunes have not been few.

**BEVERIDGE GOLD YIELD.**—The statement in the last issue of the Inyo Independent of the shipment of over \$14,000 in gold bullion from the Beveridge mines, being the product for the month of April, should attract the attention of parties seeking productive gold mines. Beveridge is fast coming to the front as a rich gold producing district. A number of fine gold quartz ledges in this camp are as yet untouched.

THE Ward Reflex is now assured that the proposed Eureka and Colorado river railroad will not be built. The road from Stockton, Utah, to Eureka, will answer all the purposes of the projectors of the Eureka and Colorado river railroad, as it will cross White Pine county fully as far south as there was ever any intention of extending the Eureka and Colorado river railroad.

**CROSS LEDGES.**—Where two or more ledges cross or intersect each other, priority of title governs, and such prior location is entitled to all ore or mineral contained within the space of intersection, but the subsequent location has the right of way through the space of intersection for the purpose of the convenient working of the mine. And where two or more veins unite, the oldest or prior location takes the vein below the point of union, including all the space of intersection.

**GOLDEN BASIN.**—This is the name of a comparatively new mining district in Arizona, located about 50 miles due east of El Dorado canyon, which is of great promise and will at an early day attract considerable attention of the mining world. The ledges are principally gold, containing little or no silver whatever, and varying in width from two inches to four feet, the assays ranging from \$10 to \$50 in gold. The country around is well timbered and there is an abundance of water for milling purposes 12 miles from the mines.

In the matter of the Richmond-Albion decision, Judge Rising wishes it to be understood that he decided that the St. George patent, owned by the Richmond company, was unlawfully issued, and upon the trial of this case, must be decreed to be the property of the Albion company; but because the matter heard before him was solely as to whether the injunction should continue or be dissolved; and as he had no power to set aside the patent on such hearing, for that reason alone he continues the injunction. We should regard this as a decided expression of legal opinion in favor of the Albion.

In the suit of the Empire gold mining company against the Pacific gold mining company, Chief Justice Morrison R. Waite, of the Supreme Court of the United States, Thursday, ordered that an attachment issue in the case. Yesterday the United States Marshal made his return on the writ, showing that he had attached the Oaks quartz mine, 1,200x500 ft., on the lode of and adjoining the Empire claim, at Plymouth, Amador county, known as the Pacific Gold Company mine. The action is to recover \$120,000, and the bonds required over this amount and damages that might result from the attachment.

### News in Brief.

BOSTON talks of undertaking a world's fair in 1885.

THREE thousand immigrants arrived in New York on Sunday night.

THE Mexican Congress Committee on Public Works reported favorably on Gen. Grant's railway contract.

SINCE the Kansas Prohibitory Liquor Law went into effect, it is said, nine-tenths of the liquor saloons have closed.

THERE is great want and misery in the State of Bolivia in consequence of the ravages of locusts on the cereals—especially rice and Indian corn.

It is said the Queen desires to confer a peerage upon Master Conigebay Israell, nephew of the late Lord Beaconsfield, but Gladstone dissents.

THE California Southern railroad at San Diego, Saturday, called for bids for 30 miles additional, making in all 82 miles let since December 10th.

A BILL will be presented in the German Bundestag regulating the employment of boys in mines, stipulating that their hours of labor must not exceed eight per day.

In London the crowd of persons on the lookout for investment has not lessened, and even the Spanish and Peruvian bonds are looking up. Sound American securities are dearer.

THE complaints respecting the condition of emigrant vessels have led the English government to dispatch Capt. Wilson to Queenstown to inquire into the correctness of the statements.

THE Swiss representatives abroad have been instructed to ascertain the views of the various States, relative to the adoption of an international law regulating hours of labor in the factories.

ST. PETERSBURG advises say the Emperor has accepted the resignation of Gen. Melnikoff and has appointed Gen. Ignatieff to succeed him. This change has produced great uneasiness in political circles.

JAMES ALEXANDER FORBES, who came to California in 1829, died at Oakland last week. He at one time owned one-eighth of the Almaden mine. He was author of Forbes' History of California, a standard authority.

THE engineers engaged in the work of constructing this ship canal across the Isthmus of Panama, at last advise that a shaft 100 ft deep, where the Chagres river dam is to be begun, and had not yet reached bed rock.

MAY 5th no river boat had left Bismarck for Benton. The wood yards the whole length of the Missouri have been washed away, and no dry wood can be got. Boats will have to bring their own coal or stop to cut wood.

GLADSTONE'S difficulties increase daily. The Transvaal affair has apparently sunk deeply into the minds of the people, and the present attitude of the Boers is regarded as extremely menacing to British interests in South Africa.

A NEW line of railroad is to be constructed from the main line of the Missouri-Pacific at the Pacific junction, to Carthage, Mo. This line will open up a new and very rich section of Missouri and will shorten the through line to Texas by about 30 miles.

ADVICES from Paris say that *La Liberte* announces that Col. Flatters' Trans-Sahara Mission will be taken up, and the murder of Col. Flatters and his followers avenged. The new expedition will consist of a regiment of 700 men mounted on camels.

GOV. OVERTON, of the Chickasaw nation, has gathered together an army of 300 men, and has issued an order that Texas cattle raisers, and whites men generally, must leave the country before June 1st, or force will be used. A similar situation prevails in the Choctaw nation.

SUIT has been brought in the Superior Court at Oakland by the Savings and Loan Society against the North Pacific railroad company, to recover the sum of \$150,000 on a promissory note. Plaintiff holds 450 of the first mortgage bonds of the denomination of \$1,000 as security, and seeks to recover on them.

RAILWAY workmen at Ekaterinastat, Russia, have pillaged the shops of several Jews. The arrival of troops stopped further rioting. Order has also been restored at Nonolop and Ananief. There have been anti-Jewish disturbances at Warsaw. The Jews at Odessa have been ordered to surrender their arms.

At the moment when the Greek question appears to be settled, a distressing telegram comes from Athens. It is asserted that the Porte, covertly assisted by Austria and Germany, intends to prevent a peaceful settlement. It is stated further, that England's isolation encourages the three Empires to settle the Balkan question. The Bulgarian troubles are associated with this idea.

PANAMA advices of May 7th state that Frederick Ford, a British subject, and representative of the famous house of Dreyfus Bros. & Co., Paris, was arrested recently in Lima by the Chilean military authorities and held a close prisoner for 25 hours. He was released only after energetic representations on the part of the English Minister Resident. The only crime alleged against Ford was that Piorola had addressed him a personal letter, which was intercepted and fell into Chilean hands.







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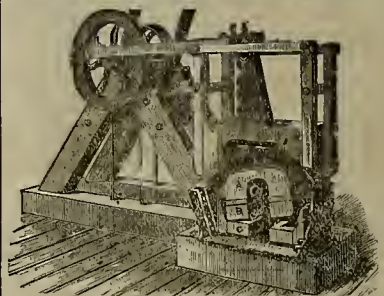
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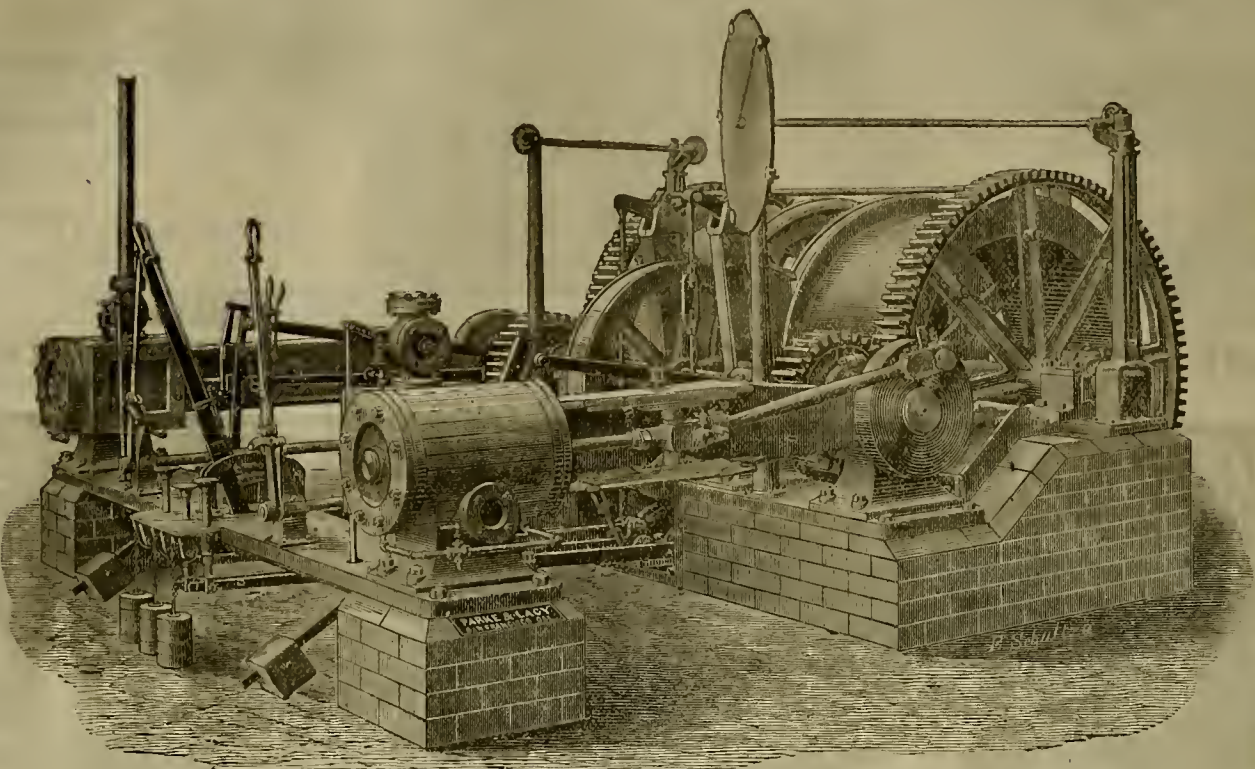
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I am respectfully yours, etc.,

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Foreman Sierra G. and S. M. Co.

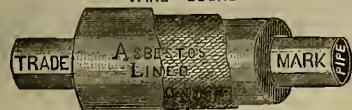
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**No. 1 XX) is the Strongest Explosive Known.**

**No. 2 is superior to any powder of that grade.**

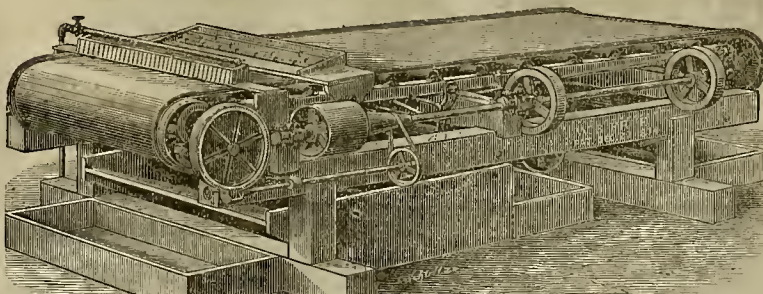
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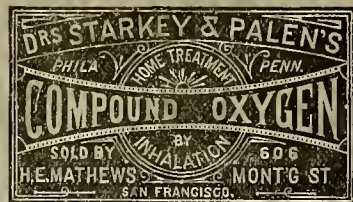
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We challenge any other Concentrator in use for a fair and impartial competitive trial, side by side, for stakes of \$1,000 each, and we mean business.

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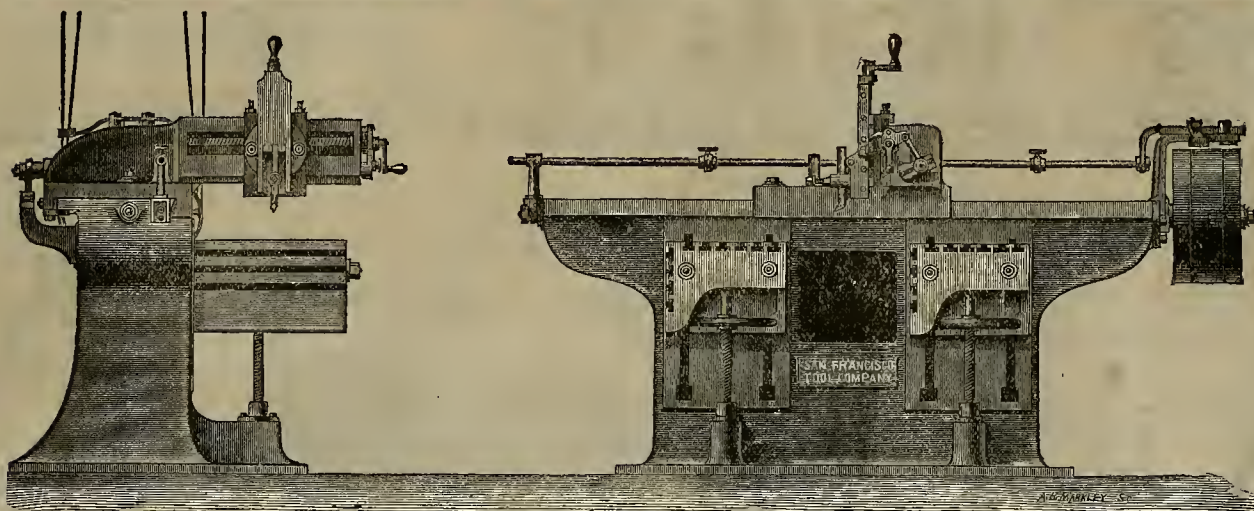
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Is prepared ready for immediate use, and of any Shade or Color desired. Any one who can handle a brush can apply it. It is impervious to our damp atmosphere, and is equally as good on Wood, Stone or Iron Work.

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FOR CONCENTRATING GOLD, SILVER, LEAD and COPPER ORES.

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Surveys for Location or Patent. Maps and Plans Drawn. Mining Properties of all kinds examined and careful reports made of the same. Consultations on Mining Investments. Address, THOS. W. REECE, CIVIL ENGINEER, Oroville, Butte Co., Cal. References given and required.

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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, MAY 28, 1881.

VOLUME XLII  
Number 22.

## A Siphon Mining Sluice.

In the stamp mills in common use in the mining sections, the mills are divided up into batteries containing five stamps each. Any desired number of these may be placed in line, and in front of each one is a series of amalgamating plates, over which the material flows into a sluice, the sluices from all the batteries leading to a common sluice, into which all discharge. The main sluice conveys the tailings away to the place of deposit. Notwithstanding the precautions which are taken, a certain portion of the precious metals escape with the tailings into the sluice, and is lost.

The object of the invention illustrated on this page (which was patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Joseph M. Robinson, of Eureka mill, Plumas county, California), is intended to reduce this loss by placing at the end of the main sluice a peculiarly constructed sluice-section, through which the material must all flow, and in which the escaping particles of gold, quicksilver, etc., are caught and saved. In case there are pans in use in the mill, their tailings are also conducted into the main sluice to be conveyed away from the mill, so that all the material passing away has to pass through the sluice section before it can escape.

At the end of the main sluice is placed the curved sluice-section A, it being mounted on an axle or shaft which fits in the bearings or boxes as shown. At the upper end of this sluice-section is a hopper B, into which the tailings flow from the main sluice, and below this hopper is a trough, C, a foot or more deep.

From this trough the sluice-section inclines upward, as shown, to the neck of this section, and thence it inclines downward sharply, the whole being somewhat of a siphon shape. At the outer or lower end, which is considerably lower than the hopper and trough, is a gate controlling the flow from the sluice. If the water from any one of the batteries is shut off at any time, this gate in the discharge pipe can be closed a little, so as to keep the section full of water and sealed from the air.

If, for instance, the trough of the section is a foot deeper than the hopper, and the distance from the bottom of the trough to the bottom of the neck, or highest point to which the water must rise to escape down the discharge portion, is also a foot, and the lower end of the discharge pipe were on a level with the hopper, said hopper being the height of the neck, the water would flow through the section of its own volition; but when sand, tailings, etc., are brought into the sluice with the water, this will settle at the bottom and remain there, because there is no force to throw it out and the section would become choked.

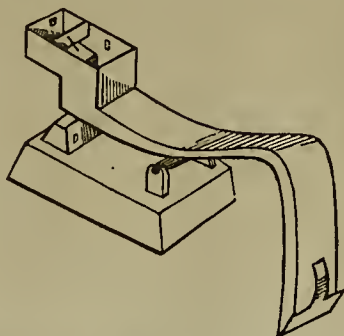
To prevent this, the inventor strengthens the discharge pipe considerably and brings its lower end lower than the hopper, the siphon principle being then brought into action to relieve the sluice and draw the material with the water up the incline to the neck, where it passes down and out. Any desired length may be given to the discharge pipe, enough only being required to throw out the sand and light sulphurets, leaving the gold and particles of mercury, heavy sulphurets, etc., in the sluice.

This platform on which the section stands is so placed that the hopper will come under the end of the main sluice from the wall, and low enough, so that the end with the hopper may be raised or depressed at will. When one end is raised the other end is correspondingly depressed, which motion will regulate the working of the machine to a certain extent. This is rendered possible by the section being mounted on the axle, as shown, so it may be oscillated at will. The block D, under the hopper, is removable, so that blocks of different sizes may be substituted to regulate the inclination of the section.

As the material passes into the sluice section, on dropping from the hopper into the trough, it is compelled to move up the incline with the current. The lighter particles do this easily; but the quicksilver globules and heavier particles of gold and other precious metals, by their gravity, will remain below and not rise upward,

being caught in the sluice. If the water is not allowed to run over the hopper, the floured quicksilver will remain on top of the water in the hopper until an aggregation of particles takes place, when it will gravitate to the bottom of the sluice, and be saved the same as gold or other heavy material.

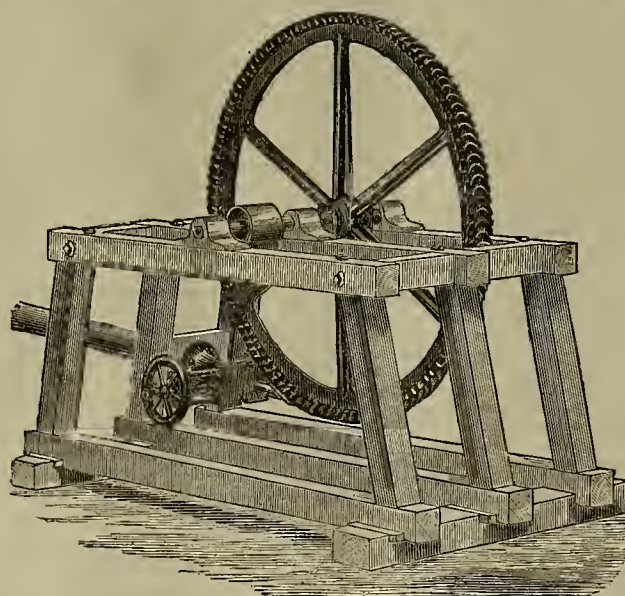
In starting the sluice the hopper is raised a little above the neck; and, by having a gate in the end of the main sluice, this gate will, when



MINING SLUICE FOR QUARTZ MILLS.

closed a moment, gives a head of water sufficient to crowd it through the section and force the air out of the discharge pipe. The siphon being thus started, the long column of water will continue to draw the material up the incline of the section as long as the supply is continued.

Power is thus gained sufficient to draw the tailings through the incline sluice without drawing out the precious metals. The water has an



THE KNIGHT WATER WHEEL.

easy and even flow through all parts of the sluice alike, and the user can, of course, apply any amount of power equal to atmospheric pressure, or as little as he desires, the inclination being regulated as well as the flow through the section.

The Virginia City Enterprise says: In all directions we hear of laborers being wanted to do various kinds of work. This is rough on the tramps. They are quite bewildered, and hardly know in what direction to send their steps to avoid stumbling upon a place where they would find work staring them in the face.

The profit of copper mining in the Walker River, Nev., region now appears to be an established fact. There is room and occupation there for a dozen furnaces.

## The Knight Water Wheel.

The Knight, as a pressure wheel, having obtained a success seldom equaled by any new invention in its line, we give in this issue a cut showing in part the style of it as near as a cut can, that those who have water for power may be able to form some idea of it.

Of these wheels, there are now running quartz

calculated for it from actual tests. The wheels are made of all diameters, according to work required. The face of buckets also vary, but usually run from three to six inches, according to wheel.

Some very important improvements have lately been made in the nozzle, which forms one of the important features of the wheel. This is in the addition of what may be termed a hydraulic engine, making a complete regulation of the power, and all can be operated 200 ft. from the wheel. This addition allows the introduction of six openings as water discharges, instead of three as formerly. This improvement is more particularly used on low heads and larger bodies of water. For hoisting works it is universally used. This new feature is not represented on the cut, as the patent on this is in course of issue through the MINING AND SCIENTIFIC PRESS Patent Agency, but will be illustrated in due time. These wheels are manufactured by Knight & Co., Sutter Creek, Cal., Almarin B. Paul & Co., office room 20, Safe Deposit building, San Francisco, Cal., and Fraser & Chalmers, No. 139 Fulton street, Chicago, Ill. By writing to any of the above firms all desirable details can be had.

## Sliding Scale for Mines.

They have a great deal of trouble in England with miners' strikes. The men get small wages and see no chance of advancement of any kind, while they have plenty of laborious, tiresome work. All sorts of plans have been suggested to ameliorate the condition of the men and to prevent the repetition of disastrous strikes. Employers have been asked to make concessions to the men, and the men to make concessions to the employers. The question has been discussed in all its bearings. A national conference of miners' representatives has just been held at Birmingham, at which it was decided to adopt a sliding scale as the best means of preventing strikes and lock-outs.

It is interesting to note that it was stated at the conference alluded to, which represented about 195,000 miners, that at the present time there are about 180,000 miners working in mines on regulations of some kind or scale, but many of them, it was stated, are so dissatisfied with their working that they are about to give notice to have them put on a different basis, the north of England miners being amongst the number. It was resolved that all the associations or bodies of men who are bound by a sliding scale should forward a copy of such scale and the regulations attached to it to Mr. Macdonald, M. P., with a view of his suggesting the basis of some scale or method of payment which would be more satisfactory to the miners employed. Another resolution was agreed to, to the effect that the conference thought that accountants ought not to be bound to secrecy, but should be allowed to give some details to the representatives of the men to show and convince them that the work had been got satisfactorily through.

QUARTZITE AND QUARTZ.—The Richmond Co. of Eureka, Nevada, in sinking the last 200 ft. of their main shaft, cut through the limestone zone and penetrated the quartzite; since sinking was resumed some 50 ft. has been made. The Eureka Sentinel, now announces that the barren quartzite has given way to an almost pure white quartz carrying a fair amount of metal. Assays average right along \$30 per ton. It is a magnificent article of flux, and now the ore taken from the shaft is being saved in the dumps for shipment to the reduction works. This is an entirely new feature in mining on Ruby Hill, and may add untold wealth to the mines of that portion of the district. Further developments will be watched with no little interest. If the whole quartzite belt should change at that depth to paying quartz the mines would become practically inexhaustible.

REPORTS from Paradise are to the effect that a fine body of rich ore has been cut into in the face of the drift in the Wild Goose. It is said to be a richer and larger body than any heretofore found in the mine.

THE Hansuer smelter, Utah, is running steadily and producing excellent hullion.



We admit, unendorsed, opinions of correspondents.—EDS.

made a change for the better in that camp.



## MECHANICAL PROGRESS.

## Iron as a Plastic Material.

The original method of forging iron by the simple application of the hammer, continued and varied until the desired form was given to the product, was largely improved upon by the introduction of drop-forging. By the use of a die or matrix, and the weight and gravitation of the powerful hammer falling upon the iron, it was made to assume almost instantly the shape required under the immense force thus brought to bear; and for a great number of processes this method has been found entirely satisfactory. Not only was the rate of production vastly increased by this advance of the art, but the quality of the manufactured article, as to the condition of the fiber of the metal, where there is not too radical a change from the original form of the bar, has proved to be all that its practical use and service requires.

In the exceptional cases just hinted at, however, it was perceived that a still finer adjustment of cause and effect was demanded to meet the necessities of the case. If the change of form is such that the percussion of the hammer in drop-forging destroys the fiber of the iron, the result is a failure, so far as the quality of tenacity is concerned. How to meet this difficulty, and apply the necessary amount of force without the destructive effect of the sudden stroke, has been a perplexing question. To administer the blow, and yet preserve the continuity of the fiber, was an evident impossibility. How, then, should the requisite degree of power be employed upon the iron so as to give it the form of the mold, yet without disintegrating its metal itself?

The solution of the problem has been found in treating the iron as a plastic substance, which it in fact becomes when heated to a certain degree—something less than a welding heat, and very far below a fused condition, but still imparting to it sufficient mobility to serve the purpose. In this state it is subjected to enormous pressure, steadily yet rapidly acting, and forcing it into the matrix with irresistible effect, inasmuch that when the product of this compressive forging is examined, it is found to be not only perfect in shape but unbroken in fiber, and therefore having all the toughness which it possessed in the bar. The work is done with speed, and thus far there is no dissent from the verdict of approval with which the results have been received by the iron-working community. The new process is perhaps not strictly a discovery; it appears to be rather the fruit of a closer knowledge of the metal with which it deals, and a more accurate determination of the precise state in which it will submit to be treated as a fluid while still retaining its texture as a solid substance. "Getting it down to a line point" is a phrase from the vocabulary of the street; but it gives in few words the exact nature of this latest achievement in the art of iron-working, and indeed of most of the substantial victories which science is daily winning for mankind.—*Industrial World.*

**MANGANESE BRONZE FOR PROPELLERS.**—*Design and Work* states that the Lords of the Admiralty have ordered the *Colossus*, now in course of construction at Portsmouth, to be fitted with a manganese bronze propeller, in place of the one of gun metal, originally ordered. This decision has been arrived at after a series of comparative experiments made with the two metals in the presence of Mr. Farquharson, of the Admiralty, at the Works of Messrs. Maunslay, Sons & Field, the contractors for the engines. Bars of both metals, one inch square, were placed on supports 12 inches apart, and first subjected to a steady pressure applied in the middle of the bars, and afterwards to impact by a weight of 50 lbs. falling from a height of five ft. With a steady pressure the gun metal bars dipped between the supports, or broke with a strain of 28 cwt., while the manganese bronze bars required 54 cwt. to break them. Tested by impact, the gun metal bars broke with from 8 to 9 blows, while it took from 13 to 17 blows to break the manganese bronze bars. The ultimate bend of the latter was also in both cases more than that of the gun metal, showing nearly double the strength, with superior toughness. The advantages claimed for manganese bronze over gun metal are, first, a considerable saving of actual weight of machinery, and secondly, that it enables a thinner, and consequently a better, blade to be made, offering less resistance to the water, and equalling in strength the gun metal blade of greater dimensions.

**BOILER PATCHES.**—A mistake is often made in making a boiler patch of thicker metal than that of the shell of the boiler needing it. A common reflection ought to show the absurdity of putting a five-sixteenths or three-eighths patch on an old one-quarter inch boiler shell; it is not so rare an occurrence as one would imagine. A piece of new iron three-sixteenths of an inch thick, will, in most cases, be found to be stronger than that portion of a one-quarter inch old plate needing repairs.

**STAINING WOOD GREEN.**—To half a pound of the heat verdigris add one ounce of indigo; boil six pints of vinegar. Allow the veneers to immerse till the color has penetrated.

## The Gilchrist Basic Process in America.

The *Industrial World* says: The fact that the Bessemer Steel Association has purchased, for \$400,000, the American right to the Thomas-Gilchrist basic method for dephosphorizing iron, should have a stimulating effect upon the inventive genius of this country, especially in metallurgical circles. It is evident that the association intend to keep the steel rail production under their own control, and any new process that will rival the Bessemer or the Thomas-Gilchrist processes, will find a ready and liberal purchaser in the association. In any event, if the steel rail manufacturers would not become purchasers, there is plenty of capital ready to back up a new invention in this direction, if it can satisfactorily demonstrate its worth. It is not too much to assert that we are on the eve of great discoveries in the methods for manipulating the metals. The great advancement already made we trust is but a prelude to that greater progress which we shall yet see in this boundless domain of scientific research. No laurels can be taken from the brows of men such as Sir Henry Bessemer, Siemens, or Gilchrist, but honor and renown is reserved for other workers who shall either hew out new paths into the heart of the metallic world or carry on still further those already marked out by the men we have mentioned, and by other noted metallurgists of our times.

**STARTING FRICTION.**—When a shaft bearing is at rest in its box, the oil is pressed out from under it; either out of the box altogether, or upward to the space above the shaft, between the shaft and box. No doubt the metal of the shaft then settles down to actual contact with the metal of the box. In starting a lot of machinery into motion, the metal of the shaft must actually drag, for a short distance, in contact with the metal of the box, making the machinery hard to start. But as the bearings make part of a turn in their boxes, the oil adhering to the surface of shaft bearings is dragged in between the box and shaft underneath, thus floating the bearing upon a sea of oil. This sea is, however, not very broad or deep, but there can be no doubt of flotation. As flotation takes place, the bearings rotate more easily than when the metal drags in contact. This explains why starting friction is greater than friction of motion in the machinery. When heavy pressures are brought to bear at the boxes, the oil is hindered from entering freely between the surfaces; and if, at the same time, the two surfaces are not nearly parallel, there may possibly, or even probably, be metal contact at the prominences. The high resistance thus caused will produce heat at the rubbing parts, which, by continuous motion, is sure to become excessive, resulting in destruction of lubricant, abrasion of metal surfaces, waste of power, etc.

**TORSION.**—If we know the force in pounds per square inch that it takes to shear any material, then that required to break a cylinder of it by torsion would be the leverage in inches, divided into half the shearing force in pounds per square inch, times 3.1416 times the cubic root of the cylinder area in inches. A square shaft is about one and one-fifth times as strong against torsion as a round one, and one-fifth less than a round hollow one of the same sectional area. Hollow shafts resist torsion better than solid ones of the same area of metal. Wrought iron shafting, supported at eight or nine ft. intervals by self-adjusting hangers, may have a diameter equal to the cube root of the number of horse powers it transmits, divided by the revolutions per minute and multiplied by 125. The faster shafting revolves when transmitting a given number of horse powers the less the torsional strain.

**A NOVEL KIND OF WIRE BELTING.**—Herr J. Jarolimek, of Hainburg, Austria, has brought out a novel kind of wire belting, which is described as follows: The wire is wound on spindles, the diameter of which is as small as practicable, and is obtained, therefore, in the form of a long spiral spring. *Der Techniker* states that the main point to be observed in using these wire coils is to give them dimensions proportioned to the power to be transmitted, so that while flexible, they do not suffer undue elongation when in use. Practical trials have proved that the proper proportion between tenacity and elasticity of these coiled wire strings is obtained when the spindle, around which it has been wound, has a diameter equal to that of the wire. The two ends of a string are hooked together, and each string (the number varying according to the power transmitted) is laid in a groove on the pulleys. This method of transmission is reported to be cheap and effective.

**METALLIC BELT.**—An inventor in Hartford, Conn., has patented a belt which is made of iron wire, the selvages being brass and copper. The web is of cotton, several threads being woven in without being twisted together. A double fabric is made, between which, or inside of which, a number of single heavier wires are enclosed to take the tensile strain of the belt.

**RULE for calculating the pressure of steam on a cylinder boiler at any given number pounds of steam:** Multiply the diameter in inches by the length in inches and by the pressure per square inch; the result is the total pressure tending to rupture the boiler.

## SCIENTIFIC PROGRESS.

**BEHAVIOR OF METALS IN SOLIDIFYING.**—The question is again before scientists for discussion: Whether the expansion of bodies on heating and contraction on cooling occur, as a rule, in the passage from the solid to the liquid state, and vice versa. Ice, it is well known, behaves differently, and is regarded as an exception. Kopp's researches have shown that phosphorus, sulphur, wax, stearic acid, stearine, chloride of calcium, phosphate of soda, hyposulphate of soda and Rose's metal grow larger in volume when fused. Observations made in the past concerning metals give very discordant results, and therefore Nies and Winkelmann have lately studied the question anew. As a foundation experiment, the solid metal was put into the fused metal. In certain cases the difference of density could be measured. For instance, tin, in solidifying, is increased in volume 0.7%; zinc is increased 0.2%; solid bismuth is fully 3% less dense than the fused metal. Expansion in solidifying was also demonstrated for antimony, iron and copper. Indecisive results were obtained with lead and cadmium; lead presented difficulties in the probably very small difference of density as a solid and as a liquid, its small heat conductivity and heat of fusion; and cadmium in the fact that in fusion it passes first into a viscous state. Thus, of the eight metals examined, six distinctly showed expansion in solidifying, and expansion may occur in lead and cadmium. If these experiments stand good, expansion would seem to be the rule for metals.

**THE VARIABLE COLOR OF SALICYLATE OF SODA.** The changeableness of remedies, whether in taste, effects or color, is an important thing to guard against. The first may be due to negligence, and often to carelessness, but the latter, or a variability in color, is rarely the fault of the dispenser, but of the manufacturing chemist, and at times depends on certain influences over which the pharmacist has no control. Salicylate of soda is of the latter class, sometimes occurring as a snow-white powder, and again of a dirty gray and even brown color. We find an explanation as follows: Whenever salicylic acid is brought or left in contact with an excess of an alkali, the mixture turns brown verging on a black. We do not know that any one has yet ascertained the exact cause of this change, but such is the fact. Manufacturers have to exercise the greatest care to prevent the point of neutralization being overstepped in the preparation of these salts; in fact they prefer, in order to insure a white salt, to have a trifling excess of salicylic acid present.—*Pac. Med. and Surg. Jour.*

**THE POLYSCOPE.**—At a recent soiree in the Paris Observatory, M. Trouve showed a live fish with its body lit up from within by his polycope, a minute form of which, with conducting wires passing to the hands of the operator, the animal had been caused to swallow (comfortably, let us hope). The whole body became transparent in the dark, so that the vertebrae could be counted and all details examined. This instrument promises to have many uses. Among others, it has already been applied, *La Nature* says, to show students the texture of the rectum and bladder; to facilitate extraction of a projectile at the back of the nose, to examine the stomach of a hull (in which a gastric fistula was formed), to lighting the interior of shells and cannon for examination, also to lighting powder magazines, in which case the reflector is inclosed in a triple envelope of glass.

**EFFECT OF COLD ON MAGNETIZED STEEL.**—A recent investigation conducted in the physical laboratory of Harvard University has led to the discovery of the remarkable fact that intense cold can deprive magnetized steel bars of nearly all the magnetism which may have been imparted to them. The intense cold was produced by solid carbonic acid. This fact has an important bearing upon observations of the earth taken in high latitudes; for what appear to be daily and yearly changes in the earth's magnetism may be due in large part to conditions of temperature, which effect the magnets used in the observations. It also must be concluded that the molecular condition of steel is changed by great cold.

**CHANGES IN WATER-LEVEL OF LAKES IN OREGON AND CALIFORNIA.**—A letter to the editors from Mr. B. F. Dowell, of Jacksonville, Oregon, states that Goose lake, 30 miles long and two-thirds of it in Oregon, the rest in California, was almost dry in 1853 and 1854, while in 1869 and 1870 there were 10 feet of water; its depth has been increasing since 1870, and there is a probability of its discharging, as at some former time, into Pitt river. Clear Lake also, about two miles farther south, is 10 feet deeper than it was in 1833-4; and Tulie lake, in the same region (the locality of the lava beds where were the hiding places of the Modoc Indians) is 10 or 15 feet higher to-day than then.

**HYDROBROMIC ACID AS A REAGENT FOR COPPER.**—A drop of the solution in question is placed in a watch-glass, a drop of hydrobromic acid is added, and the mixture is evaporated at a gentle heat. When it is reduced to the hulk of one drop, a rose-red coloration appears, three or four times more intense than that produced by potassium ferrocyanide. In this manner 1-100th milligram copper may be detected.

**SELF-LUMINOUS PHOTOGRAPHY.**—According to the *Photographic News*, self-luminous photographs are attracting much attention in Vienna. When these are examined by daylight they look like ordinary paper photographs, but in the dark they are beautifully phosphorescent in the high-lights, have a more or less feeble glow in the half-tones, and in the deep shadows possess no luminosity. The preparation of these self-luminous photographs is very simple. A silver print on albumen paper, or a collotype is rendered transparent by brushing over it a mixture of equal volumes of castor oil and oil of turpentine. The superfluous oil is removed by means of cotton-wool or a linen rag, and the phosphorescent paint is then put on. The paper thus prepared is then dried, and afterward mounted with its reverse side on cardboard. As soon as it has been exposed to the daylight and the light penetrates the transparent or semi-transparent parts, the phosphorescence of the luminous paint underneath is excited, and in the dark the image is seen with all its gradations. Brilliant pictures and moonlight landscapes give especially good results.

**A NOVEL PHENOMENON.**—Dr. Phipson, an English chemist, describes a novel phenomenon observed in connection with a zinc white of a dazzling purity, obtained by precipitating a solution of zinc sulphate by means of barium sulphide, submitting the precipitate to strong pressure, and igniting it with limited access of air. If any barium sulphide escapes oxidation, the white compound, on exposure to the sun, begins to darken, and in about 20 minutes becomes of a dark slate color. If removed into a dark place it gradually loses color, and in about five or six hours it becomes again snow-white. This experiment may be repeated with the same specimen as often as desired. Further, this change of color does not take place under a slip of common glass, whether thick or thin; at most the compound takes a slight yellowish brown color on exposure to the sun for two hours. The sample on analysis was not found to contain silver or any other substance known as antic.

**CHANGES IN THE DIAMETER OF TRUNKS OF TREES.**—According to the *Gardener's Chronicle*, MM. Kraus and Kaiser have been making some researches from which it appears that the trunks of trees undergo daily changes in diameter. From early morning till early afternoon there is a regular diminution till the minimum is reached, when the process is reversed and the maximum diameter attained at the time of twilight; then again comes a diminution, to be succeeded by an increase about dawn—an increase more marked than that in the evening. The variations in diameter coincide, therefore, with those of the tension, but they are shown to be inverse to the temperature, the maximum of the one corresponding roughly to the minimum of the other, and so on.

**PHENOMENA OF OPTICS AND OF VISION.**—M. Treve. The author mentions the fact that the flame of a lamp appears brighter, and that a vertical shaft, a post, or mast is seen more distinctly through a vertical than through a horizontal slit, while a house, a landscape or the disk of the sun or moon is perceived more clearly through a horizontal slit. He finds similar differences in photographs according as the light passes from the object to the plate through a vertical or a horizontal slit, and ascribes the results to the action of diffused light.

**A NEW CELLULOID.**—This new product is said to be obtained from well peeled potatoes, which are treated for 36 hours with a solution of 8 parts sulphuric acid in 100 parts of water. The mass is dried between blotting paper, and then pressed. It is further stated that in France smoking pipes are manufactured out of this new material which are quite equal in appearance to the meerschaum. By heavy pressure the material acquires such a hardness that billiard balls can be manufactured with it.

**THE BLUE OF THE SKY.**—M. Chappuis thinks that the blue of the sky may be due to ozone present in the upper regions of the air. He argues that the electrical discharges constantly taking place will produce ozone; and the recent researches of himself and M. Hantefeuille have shown that ozone, at any rate when near its condensation point, is of a blue tint. He has examined the absorption-spectrum of ozone and finds nine dark bands in it, three at least of which correspond with known bands in the telluric spectrum.

**THE TELEPHONE THROUGH WATER.**—*L'Electricite* states that M. Dohrn has introduced the telephone in connection with his scientific explorations of the bed of the Bay of Naples. By its use the diver and the hoaman overhead are able to communicate with each other quickly and intelligibly.

**CONVERTING SOUND INTO LIGHT.**—A French scientist claims that he has succeeded in reversing the result obtained by Prof. Bell, in producing light from sound. He has described an experiment to the French Academy, by which he contends a transformation of sound into light is produced.

**A NEW COMET.**—Mr. Lewis Swift, of Rochester, N. Y., has announced to the Smithsonian Institute, the discovery, by himself, on the morning of May 1st, of a new and quite bright comet. It rises a little before the sun and is moving slowly south.



# Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 12.	Week Ending May 19.	Week Ending May 26.	Week Ending May 26.
Alpha.....	41 3.70 3.90	3 3.30 3.16	31 2.90	
Alta.....	3.45 3.10 4.05	3.30 3.55 3.30 3.35	2.85	
Antes.....	2.35 2.35 2.35	1.70 1.10 1.30 2.30	1.30	
Albion.....	3 3.95	2.45 3.30 2.80 3.80	2.30	
Argenta.....	40c 35c 65c	60c 40c 35c 35c	20c	
Adenda.....	30c 25c 25c	25c 20c 30c	2.15	
Belcher.....	2.60 2.20 2.35	1.80 2.35 2.55 2.50	2.15	
Belmont.....	12 11 12	10 12 10 13	11 11	
Best & Belcher.....	1.55 1.05 1.05	70c 95c 75c 70c	60c	
Bullion.....	90c 70c 80c	75c 60c	70c	
Bechtel.....	50c	50c	50c	
Belle Isle.....	7 6 6 6	6 6 6 6	6 6	
Belidors.....	90c 80c 1 85c	90c 80c 85c 65c	65c	
Bulwer.....	31 3 31	3 3 3 3	3	
Boeton.....	80c	80c	80c	
Black Hawk.....	230 230 230	230 230 230 230	230	
Booker.....	60c	15c 10c	15c 10c	
Oledonia.....	50c 25c 35c	25c 30c 20c 25c	10c	
California.....	1.10 1.10 1.10	1.10 1.10 1.10 1.10	1.10	
Challenger.....	1.05 1 1	1 1 1 1	1	
Chollor.....	34 31 33 35	3 2.60 2.65 1.95		
Confidence.....	4.30 3.95 4.10	3 3.60 3 1 4		
Con Imperial.....	20c 15c 15c	10c 20c 10c 15c	15c	
Con Virginia.....	2.60 2.30 2.65	2.30 2.70 2.25 1.65		
Crown Point.....	55c 25c 35c	30c		
Columbia.....	55c 25c 35c	30c		
Champlou.....	55c 25c 35c	30c		
Concordia.....	55c 25c 35c	30c		
Concordia (Va.).....	55c 25c 35c	30c		
Con Pacific.....	1.10 1 1	1 1 1 1	1	
Derbec.....	1 70c 95c	60c 1 75c 1 1.10		
E. Mt. Diablo.....	35 50 35	35 35 34 33	33	
Eureka Con.....	1.65 1.40 1.45	1.15 1.40 1 1.35 1.15		
Exchequer.....	1.65 1.40 1.45	1.15 1.40 1 1.35 1.15		
Endowment.....	1 75c 80c	80c 75c 60c 80c		
Grand Prize.....	1.70 1.1 1.1	1.30 1.35 1.30 2 1.95		
Golden Gate.....	65c 55c 60c	55c 55c 60c 65c		
Goodrich.....	7 6 7 5	6 6 6 6	6 6	
Gould & Curry.....	7 6 7 5	6 6 6 6	6 6	
Hale & Norcross.....	6 6 6 5	4.40 4.95 4.60 4 3 3		
Head Center.....	2 2 2.10	2 1 1 1		
Hussey.....	40c 30c 30c	20c 25c 20c 15c		
Independence.....	1.15 1 1 1	1 1 1 1	65c	
Justice.....	3.10 2 2 2	2 2 2 1.90 1.60		
Jackson.....	15c 10c 15c	10c 20c 10c 20c		
Janitor.....	15c 10c 15c	10c 20c 10c 20c		
Kentuck.....	3.10 2 2 2	2 2 2 1.90 1.60		
Kosuth.....	15c 10c 15c	10c 20c 10c 20c		
Lady Bryan.....	15c 10c 15c	10c 20c 10c 20c		
Lady Wash.....	15c 10c 15c	10c 20c 10c 20c		
Leviathan.....	15c 10c 15c	10c 20c 10c 20c		
Leads.....	15c 10c 15c	10c 20c 10c 20c		
May Belle.....	15c 10c 15c	10c 20c 10c 20c		
Modoc.....	15c 10c 15c	10c 20c 10c 20c		
Manhattan.....	15c 10c 15c	10c 20c 10c 20c		
Marion White.....	30c 25c 30c	30c 25c 30c 25c		
McClinton.....	34 25 25	25 25 25 25	2.30	
Memo.....	15c 12 12	11 10 12 10	10 12	
Mexican.....	15c 12 12	11 10 12 10	10 12	
Mr. Diablo.....	15c 12 12	11 10 12 10	10 12	
Morning Star.....	50 25 25	25 25 25 25	2.30	
Mt. Potosi.....	21 2.10 2.10	2.10 2.10 1.95 1.95	1.90	
Noonday.....	1.60 1.1 1.1	1.1 1.1 1.1 1.1	1	
New York.....	1.60 1.1 1.1	1.1 1.1 1.1 1.1	1	
Northern Belle.....	1.05 80c 1 90c	90c 90c 60c 1 80c		
North Noonday.....	2 1.30 1.30	1.15 1.35 1 1.30		
Navajo.....	2 1.30 1.30	1.15 1.35 1 1.30		
Occidental.....	2 1.30 1.30	1.15 1.35 1 1.30		
Ophir.....	2 1.30 1.30	1.15 1.35 1 1.30		
Original Keystone.....	2 1.30 1.30	1.15 1.35 1 1.30		
Overman.....	2.05 1.70 1.95	1.65 1.1 1.40 1.40	80c	
Oro.....	1.10 1 90c	45c 90c 80c 85c 75c		
Paris.....	50c 45c 45c	45c 45c 45c 45c	2.20	
Potosi.....	45c 45c 45c	45c 45c 45c 45c	2.20	
Queen Bee.....	10c 10c 10c	10c 6 10c		
South Bulwer.....	35c 30c 30c	30c 30c 30c 20c		
Savage.....	4.60 3.95 4.55	3.80 4.40 3.95 3.5		
Seg Belcher.....	12 10 12	11 15 12 15	14 14	
Sierra Nevada.....	25c 20c 20c	15c 20c 15c 15c	10c	
Silver Hill.....	25c 20c 20c	15c 20c 15c 15c	10c	
Silver King.....	25c 20c 20c	15c 20c 15c 15c	10c	
Succor.....	2.10 1.85 1.95	1.2 1.10 1.95 2 1.70		
Summit.....	2.10 1.85 1.95	1.2 1.10 1.95 2 1.70		
Scorpion.....	30c 25c 40c	30c 25c 30c 15c		
Solid Silver.....	30c 25c 40c	30c 25c 30c 15c		
South Standard.....	30c 25c 40c	30c 25c 30c 15c		
Stratford.....	80c 55c 75c	70c 60c 55c		
Tioga Con.....	4 4 4 3.90	4 3 4		
Tiptop.....	25c 10c 25c	40c 10c 12 11 11		
Tuscarora.....	10 9 9 8	10 9 9 8	2 2	
Union Con.....	2 2.05 2	2 2 2 2		
Utah.....	1.40 1.20 1.20	1 1 1 1	1.14	
Wales.....	1.40 1.20 1.20	1 1 1 1	1.14	
Yellow Jacket.....	51 4.80 4.90	3.65 4 3.80 3.90	3.40	

## Sales at S. F. Stock Exchange.

Thursday A. M., May 26.	10 Seg Belcher.....	10 Seg Belcher.....
200 Alta.....	475 Sierra Nevada.....	12 12
400 Andes.....	100 Union.....	12 12
175 B & Belcher.....	160 Yellow Jacket.....	3 12 30
280 Belcher.....		
130 Bullion.....		
145 Benton.....		
35 Confidence.....	500 Argenta.....	20c
30 California.....	11 61 20	3.70
125 Con Virginia.....	100 Belding.....	5c
210 Chollor.....	300 Belmont.....	70c
350 Crown Point.....	200 Bodie.....	20c
1200 Con Imperial.....	200 Belle Isle.....	45c
50 Curtis.....	200 Black Hawk.....	20c
290 Gould & Curry.....	150 Concordia.....	12
150 Golden Gate.....	200 Grand Prize.....	45c
280 Hale & Norcross.....	575 D Standard.....	50 10c
1000 Justice.....	65 Eureka Con.....	32 33c
570 Julia.....	550 Goodahaw.....	55c
635 Ophir.....	200 Grand Prize.....	45c
630 North Ex. Fargo.....	150 Mono.....	2 40
100 New Wells Fargo.....	150 Noonday.....	1 15c 1.20
635 Ophir.....	180 Navajo.....	60 60c
1580 Overman.....	115 101 10	65 60c
1580 Potosi.....	100 Star.....	10c
1110 Savage.....	200 Silver King.....	22 22c
250 Silver Hill.....	105 Tiptop.....	14 14
110 Scorpion.....	100 Tioga Con.....	40c
250 Silver Silver.....	75 Wales.....	13 13
250 Sierra.....	725 Wedge Con.....	1 1

A NEW FURNACE PRODUCT.—Herr W. Sonnet, of Duesseldorf, proposes a method for utilizing blast furnace cinder. He melts 60 to 80 parts of cinder, 10 to 20 parts of soda residues, 1 to 20 parts of lime, 1 to 10 parts of manganese ore, and 1 to 10 parts of diabase rock in a cupola so as to obtain a material having the following composition: Silica, 60%, lime, 10%; alumina, 10% oxide of iron and oxide of manganese, 8%; and alkalis, 12%. It is stated that this material is so hard and tough that it can be turned like steel. It resists the action of water so well that it can be used for pipes, tubes, masonry, door steps, window sills, etc.

PARK CITY looks way up as the leading mining camp in Utah. More improvements are being made there this season than ever before in the history of the place.

TIN, silver and lead in paying quantities have been discovered near Ilwaco, Oregon.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

### ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'NT. SALE.	SECRETARY.	PLACE OF BUSINESS.
Bullion M Co	Nevada	19	60 May 19	June 22 July 13	J M Brazell	328 Montgomery st
Belcher S M Co	Nevada	27	75 Apr 12	May 17 June 7	Joe Crockett	327 Pine st
Caledonia M Co	Nevada	35	25 May 3	June 7 June 28	R Wenzner	419 California st
Con Imperial M Co	Nevada	16	10 Apr 18	May 4 June 14	W B Dean	309 Montgomery st
Equitable T & M Co	Utah	25	15 May 10	June 17 July 11	O Collins	612 Montgomery st
Fresno G M Co	California	2	10 Apr 11	June 15 June 15	D Buck	303 Montgomery st
Hale & Norcross M Co	Nevada	69	50 May 10	June 15 June 15	J F Lightner	309 Montgomery st
Julia Con M Co	Nevada	15	30 Apr 27	June 2 June 24	H A Charles	419 California st
Kentuck M Co	Nevada	15	30 May 3	June 7 June 23	A O Stuart	234 Montgomery st
Lady Washington M Co	Nevada	2	15 April 15	May 20 June 8	W H Watson	302 Montgomery st
Mammoth M Co	California	6	25 Apr 13	May 7 June 10	A W Rose Jr	302 Montgomery st
Mt Potosi Con M Co	Nevada	6	25 Apr 6	May 13 June 6	E A Holmes	318 Pine st
Mono G M Co	California	12	50 May 19	June 24 July 14	W H Lett	309 Montgomery st
Paradise Valley M Co	Nevada	2	07 Apr 8	May 13 June 3	Wm Letts Oliver	328 Montgomery st
Phoenix M Co	Nevada	13	10 May 9	June 15 July 9	H Lecker	309 California st
Real Del Monte M Co	Nevada	15	50 Mar 28	May 2 May 30	C Van Hubbard	310 Pine st
Silver Hill M Co	Nevada	15	25 May 7	June 10 June 25	W E Dean	309 Montgomery st
Sierra Nevada S M Co	Nevada	68	1 00 Apr 22	May 26 June 15	E L Parker	309 Montgomery st
Tuscarora M Co	California	13	15 Apr 15	May 17 June 7	W H Lett	309 Montgomery st
University G M Co	California	8	15 Apr 2	May 9 May 30	M B Spelling	309 Montgomery st
Yellow Jacket S M Co	Nevada	41	1 00 May 9	June 12 June 6	Wm Letts Oliver	323 Montgomery st

### OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'NT. SALE.	SECRETARY.	PLACE OF BUSINESS.
Benton Con M Co	California	5	25 May 21	June 24 July 12	W H Watson	302 Montgomery st
Boston Con M Co	California	1	30 Apr 26	May 1 June 21	F E Luty	330 Pine st
Butte Creek H M Co	California	7	10 Apr 21	May 26 June 17	R L Taylor	230 Montgomery st
Day Silver M Co	Nevada	9	25 Apr 16	May 8 June 14	J W Pev	310 Pine st
Derber Blue Gravel M Co	California	8	10 Apr 16	May 16 June 16	C Wetzl	522 Montgomery st
Excelsior Deep Gravel M Co	California	16	25 May 25	June 27 July 14	D B Chisholm	327 Pine st
Gold Lead M Co	Nevada	2	10 Apr 5	May 20 June 20	D Frankisham	331 Montgomery st
Golden Gate Con M Co	California	4	50 May 19	June 23 July 14	J T McGeehegan	318 Pine st
Iowa M Co	Nevada	13	08 Apr 23	May 30 June 13	Chas G Leavitt	411 1/2 California st
Iron Clad Con M Co	California	3	13 May 25	June 10 Aug 10	A Dott	309 Montgomery st
Independence M Co	Nevada	7	25 Apr 5	May 9 May 31	E M Hall	327 Pine st
Lodi M Co	Nevada	2	10 Apr 22	May 26 June 13	A B Paul	328 Montgomery st
Lord of Lorn G M Co	California	1	15 Apr 19	May 31 June 28	R N Van Brunt	318 Pine st
Mayflower G M Co	California	11	10 Apr 12	June 10 June 17	J Moris	328 Montgomery st
Marathon Tunnel M Co	California	4	25 Mar 19	Apr 5 Apr 30	F E Luty	330 Pine st
North Standard G & S M Co	California	1	10 Apr 25	June 1 June 25	C Van Dyck Hubbard	310 Pine st
Prospect G & S M Co	Nevada	8	10 Apr 26	May 31 June 20	H P Bush	431 California st
Peek M Co	Arizona	3	1 00 Apr 24	May 23 June 14	Chas T Bridge	224 California st
Red Hill Hydraulic M Co	California	13	15 May 10	June 10 June 17	A B Paul	328 Montgomery st
Swamp Angel G M Co	California	3	05 Apr 19	May 20 June 9	Lewis Lillie	607 Washington st
Swansea M Co	California	2	03 Apr 5	May 14 June 6	M A Wheeler	320 Sansone st
Silver City M Co	Nevada	2	10 May 2	June 6 June 27	A K Durbin	309 Montgomery st
Three Brothers S M Co	Arizona	1	30 May 25	June 28 July 30	Meade	334 Pine st
Union Gravel M Co	California	17	50 May 7	June 15 June 29	H Fieboir	320 Sansone st

### MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alpha Con M Co	Nevada	W Willis	309 Montgomery st	Annual	June 20
Bodie Con M Co	California	W H Lett	309 Montgomery st	Annual	June 6
Caledonia G M Co	California	D B Chisholm	327 Pine st	Annual	June 7
Cashier M Co	California	D B Chisholm	327 Pine st	Annual	June 7
Clara Con M Co	Nevada	D B Chisholm	327 Pine st	Annual	June 7
Excelsior Deep Gravel M Co	California	D B Chisholm	327 Pine st	Annual	June 7
Gould & Curry S M Co	California	D B Chisholm	327 Pine st	Annual	June 7
Newcastle G M Co	California	E G Mathews	318 Pine st	Annual	June 7
Leeds M Co	Utah	D B Chisholm	327 Pine st	Annual	June 7
Mount Auburn M Co	California	J T Newell	309 Montgomery st	Annual	June 1
McIntyre Gravel M Co	California	L Lillie	607 Washington st	Special	June 7
Miner Con M Co	Nevada	H Hall	328 California st	Annual	June 24
Silver Hill M Co	Nevada	W E Dean	309 Montgomery st	Annual	May 31
Tybo Con M Co	Nevada	W W Parrish	318 Pine st	Annual	June 1
Tilden M Co	Nevada	E O Masten	309 Montgomery st	Annual	June 7

### LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W W Traylor	37 Nevada Block	50	May 20
Father De Smet M Co	Dakota	H Dean	New York	50	May 10
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	25	May 16
Northern Belle M & M Co	California	Wm Willis	309 Montgomery st	25	May 16
Silver King M Co	Arizona	J Nash	315 California st	25	May 16
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	May 12
Western M Co	California	C S Curtis	309 Montgomery st	75	May 12
Navajo M Co	Nevada	E M Hall	327 Pine st	25	Mar 25



several men are employed at this mill. Placer mining on the Salmon has paid better the past season than for many years. O. O. McVail has made one clean up of \$1,000, and will make another clean up, which will end the season. The Schumacher brothers are taking out about as much a day to three men. Bloomer and Hamilton are making five and six dollars a day to the hand. The season here is slow here during this season, will be a short one, there being no snow in the hills. Mines generally shut down early. At Big Bar, Mr. Silby has taken at 50 ounces, and probably will take out as much more for the season closes. Taking the whole length of the season the reports of a short but very successful season among the placer mines, and of new and rich discoveries of quartz.

## NYO.

**YACACIO ORE.**—Inyo Independent, May 21: Cameron's mines passed southward yesterday, going to Cerro Gordo haul ore from the Yacacio mine to the mill at Keeler. The ore is first class, and will amount to 200 tons or more quantity.

**SWANSEA SLUG.**—From A. W. Elsbeth, who returned from Cerro Gordo to-day, we hear that the Swansea mine, have been overhauling the immense slag pile at the base of the hill, with astonishing results. Thousands of tons of rich, half-smelted ore and metal have been sorted out.

**IRON EXHIBITION.**—Mr. Woodhull's assay of ore from the Jack discovery at Beveridge district, resulted in 61.07 gold, and 7.85 in silver; total \$507.62 per ton. It is one of the new properties, and belongs to Dan O'Connell, Jack Welsh, Nate Mount, Charley Holmback and John Rankle.

**STARK ROCK.**—J. H. Ely, writing from Swansea, relates a discovery of "a world's wonder"—a quartz ledge (thin 200 yards of the edge of Owen's lake, near the Jeweller station. The ore sent is lead sulphides, of a low grade. John's veracity is at stake in the matter and wants the public to come and see the "wonder."

**FOR TASTING ORE.**—As completing the Keeler mill, so far as pecuniary and thorough knowledge of the business is concerned, Supt. Holt has just constructed a 1-stamp mill, and 2 small amalgamating pans. It is distinct on the regular works, and intended for crushing and sizing all varieties of milling ores, in lots of 10 or 100 lbs. more. It is a "prospect mill," destined to prove a very important auxiliary to the main concern.

**MINES BONDED.**—An agreement has been perfected between Wm. Hamilton, of the Kern & Inyo State Co., and the Inyo County, whereby, for the sum of \$1,000, the latter contracts to give a bond for a deed to the Hidalgo, Maria and El Plan gold mines, situated near Juarez camp, in Beveridge district. If, at the end of that time, the purchase price is not paid the \$1,000 is to be forfeited.

**THE LATRA MINE.**—This is a location in Beveridge district by Nate Mount, Jack Welsh, Omla Mairs and A. R. McKillo, and gives promise of considerable value. It is located on the following assays of its ore: Black ore, 3.50 gold, \$318.05; silver, \$4.70—total, \$323.65; honey-bell ore, gold, \$190.75; silver, \$5.40—total, \$196.15; white ore, 3.33; silver, \$1.17—\$20. The assays were made by T. Luther & Co., of Bodie.

**SOLD.**—The Minnata mill property, of Lookout, has been sold by Belshaw & Co. to an Arizona company, represented by J. L. Porter. It is to be removed to a point on Grapevine, on the Mojave river.

## LOS ANGELES.

**OUR MINES.**—Cor. Los Angeles Herald, May 21: We are, in the township of Soledad, have every reason to believe that we are on the eve of some astonishing developments in the way of mines. Within 15 miles on the northeast of Soledad, mines are now being worked by men who have struck pay rock (gold) which yields at a rate of one half ounce to the pan. On the northwest of Soledad, mines at the Union mine are taking out rock which will yield (the best of it) at least \$1 to the ton and in gold. This mine is about seven miles from Soledad, owned by Rush & Herrick. At the Escudilla mine, 14 miles from Soledad, they are striking very rich rock. Fourteen miles northwest of Soledad and 11 miles north of the town of Soledad, there has been a new district organized, bounties established and Recorder elected, called the Minnata district. There have been eight locations, all of which prospecting extraordinarily well on the surface. The present Climax mine has the best prospects. There are now running a tunnel into the ledge and are striking the ore in the wall rock. They will strike the main ledge at 40 ft in by 80 ft down from the surface, and then on the ledge. The district is easy of access, and is in a very healthy locality. By railway, the best way is to get off at Newhall and follow up the wagon road to the ranch, owned by Noah Chiswick, or he is more familiarly known, by the sobriquet of "Old Tex." In a short time you may look out for developments in this district that will open the eyes of Los Angeles people not only, but of people of other counties.

## SONO.

**THE NEAL.**—Inyo Independent, May 21: Developments the famous Neal mine, Indian district, near Benton, are reported as highly favorable, the 21-ft ledge holding its ore to the greatest depth, some 80 ft. Some of the ore says up to \$120 per ton, gold and free milling. It is now a property of Dr. S. A. Middleton.

**THE QUEEN.**—Supt. Adams, of the Indian Queen property, near Benton, says that the mine has sufficient ore in it to assure, for 8 or 10 months to come, the company's gulch dividends of \$17,000 to \$18,000 per month.

## EVADA.

**THE ESPERANCE CLAIM.**—Nevada Transcript, May 19: The Esperance bedrock tunnel, at French Corral, owned by Messrs. Coleman, McLean and others, is now in about 10 ft, but will probably have to be pushed 1,300 ft before reaching the gravel deposit being searched for. A full crew of men are working on it day and night, Sundays included. The Esperance Co. have a small tunnel in the hill of ground situated below the famous Milton mine, and supposedly on the same channel.

**LEADON CLEAN-UP.**—Theodore W. Sterling and his sister yesterday visited the Idaho mine and explored some of its workings. While at the mine they saw the result of week's run melted down, and the amount realized was to gold bars worth about \$14,000.

**ROUND MOUNTAIN MINE.**—The contractors engaged in vacating the main tunnel of the Round Mountain drift vein claim so as to explore the hill, have already gone 1 ft, making it now in 636 ft. They have 250 ft more to go, but as the formation being passed through is soft talus and bedrock, good progress is being made and they will probably complete the contract within the next four months.

**MINE COMPANY'S PROPERTY BURNED.**—Last Saturday afternoon a fire caught in the kitchen of a boarding house at Fall Creek, Washington township, destroying the boardinghouse, blacksmith shop and tool-house, all owned by the Blue Teat M. Co. A defective stovepipe led the damage.

**THE BANER MINE.**—On Sunday the tunnel of the Baner mine while being pushed north to a small ledge of blue ore heavily sulphuretted. Since then the ledge has been widening out rapidly and improving in quality. The place where the strike was made is at a vertical depth of 10 ft below the surface, and will soon be under the place where the very rich red gold croppings were found a few days since. If the ledge in the tunnel continues to hold out a while longer, the machinery will be removed to a point below the heavy ledge, and the water is pumped out. It will be run to the south, so the ledge can be worked from both directions. The hauling of quartz will begin on Monday.

## LACER.

**THE VALLEY FORGE.**—Placer Herald, May 21: We mentioned some weeks ago that J. W. Foulks was putting up machinery on an extension of the famous Bell mine, down at the Valley Forge, with the view of thoroughly developing it. Passing there the other day we noticed his

works in full operation. He is already down on the incline some 70 ft, and from top to bottom has a large ledge which prospects very good—the rock in some instances showing free gold. In sinking he has taken out from 50 to 70 tons, which he intends soon to have crushed, and from which he expects big returns. He is making arrangements for a steam crushing mill, which he will build close to the mine.

## PLUMAS.

**STARK BED ROCK.**—Plumas National, May 21: The shaft of the American Valley Co., in the flat below Loring & Leavitt's claim, found bottom on Wednesday, but evidently struck down on a high spur of smooth washed bedrock, which was piling rapidly to the southeast. The shaft will be sunk 8 or 10 ft deeper to make a snip for the water, and then the drifting will begin. The gravel is several ft in depth on the bedrock, and shows a prospect in fine gold, and from this indications it is probable that pay in the crevices will soon be found. The shaft is 102 ft in depth to bedrock, and is probably in a low place, which makes it favorable for easy work when the drifting begins, as the water will drain to the pump.

**RENNING.**—The mills are running steadily and work in each mine is progressing with its accustomed regularity. There is no wonderful strikes to record, as this is not a sensational mining district. It abounds in low grade ore, and in crushing this our mills are actively engaged.

**PROF. W. F. BLAKE,** of New Haven, Conn., consulting engineer of the Green Mountain, Cherokee and Gold Stripes, arrived on Tuesday, to make his regular visit to the mines, note their progress and advise as to future working.

Important developments in reference to change of ownership, and the resumption of active work in mines in this vicinity now idle, are soon to take place, which will be duly announced. The future of this district is destined to be of great importance in the mining industry of this coast.

## SAN DIEGO.

**IRONWOOD DISTRICT.**—Arizona Mining Journal, May 21: Mr. Jessie Whitten returned a few days since from Ironwood district, 20 miles west of Ehrenburg, on the Colorado river, in San Diego Co., Cal. During the past year there has been a resumption of excitement relative to mineral deposits, in the country lying along the foothills, and mountain skirting, thick desert, and several discoveries of more or less importance have been made in gold, silver and copper, prominent among which is the Copper Chief, Silver Dime and Lucky Strike, embraced in what is known as Ironwood Mining District. The ledge upon which these claims lie, runs through the country for miles, it has been exposed in a number of places and shows a uniform width of about 7 ft, lying between two places of contact. The ore is very rich in gold, silver and copper. The returns in some instances showing \$25 in gold and 20% copper. Others show very rich in silver. Jessie and Dick Whitten and Adolph Schimpf, have bonded 7,500 on this ledge. Much of the ore shows free gold.

## SHASTA.

**FRANK OUTLER.**—Cor. Redding Independent, May 21: Mr. Shafter's mine has blossomed out into a 3-ft ledge, which pays big. Mr. Chassell has made a discovery of paying quartz on the head of East Fork of Clear creek, and there has been a good prospect in quartz found lower down on the same stream, and we may expect a huge find there any day. The West is going to be a big find. Mr. Willey showed us some two ounces of mortar poundings from his lode that needed no quicksilver to save it.

## SIERRA.

**GOOD FIND.**—Mountain Messenger, May 21: Jas. Patterson, who owns a large amount of mining ground on Excelsior hill, has struck it rich. It seems there are two channels, a front and a back channel. He has been working for years in the back channel, making it pay fairly. Recently he took a notion to prospect for the front channel, which had been worked in places in former years, but not followed. As good luck and good sense would have it he found the channel the first day and made an assay. The ore is very rich in gold, silver and copper. The haul is light and the top dirt easy to get rid of, and by the hydraulic process Jim will be able to take out a bushel of money next year. The hearty of the business is that Jim owns all the ground himself, and thinks the channel extends about 3,000 ft. The gold is finely washed, one piece being shown that weighed \$40.

**THE ROCK TUNNEL.**—The rock is very hard and the tunnel is being made with a Burleigh drill. Under the able direction of Supt. H. W. Wallis, work is steadily progressing in a most workmanlike manner.

**HIDDEN TREASURE.**—The shaft on the Hidden Treasure quartz mine is down about 25 ft and the rock prospects as well as at the top.

**EXTENSION.**—The Extension reservoir was completed on Wednesday, but no prospecting has yet been done so far as we can learn. A gateway has been started from the main tunnel and is now off about 30 ft. The bedrock rises on a grade of about 4 ft in 100 so far as they have progressed.

**WIND DAM.**—A company of Chinese are preparing to wind dam the river just above Durgan bridge.

## TRINITY.

**WATER FAILING.**—Trinity Journal, May 21: Miners are still sluicing hereabouts, but water has begun to grow less and may be expected to fail rapidly if the present warm weather continues. It is expected that 2 or 3 weeks more will mark the end of the sluicing season. The generality of claims have succeeded in doing an average year's work.

## TUOLUMNE.

**BUCHANAN.**—Union Democrat: John A. Davis has bought the Buchanan mine and what one proceeded to work it systematically. No machinery is to be used. The mine has lain idle for several years. The trouble with former owners was, that being without means they tried to make the mine pay for its own development. Having passed into hands possessing the necessary capital, there is every reason to believe that very valuable property will be opened. There is no question among miners that it is one of the best in the county.

## NEVADA.

### WASHOE DISTRICT.

**SIERRA NAYAOA.**—Virginia Enterprise, May 22: Preparing to tap a drill hole in the incline, 30 ft below the 1700 level, to run a pump. The machinery is to be used for repairing the north lateral drift. The joint Union Co. and Sierra Nevada winze has been sunk and timbered 13 ft. During the past week 294 tons of ore have been raised.

**CON. VIRGINIA.**—On the 2000 level are hauling water from the Best & Belcher joint winze preparatory to connecting upraise from the 2500 level. On the 2500 level are every other drain and enlarging the east drift from the C. C. shaft.

**CALIFORNIA.**—On the 2000 level the drift north from No. 1 winze from a point 30 ft below the 2000 level has been extended 12 ft. On the 2500 level are cutting out a drain and enlarging the main east drift. Have resumed work in the joint Ghril east winze.

**YELLOW JACKET.**—The water in the mine is to-day 140 ft below the 2500 level, or 90 ft below the foundations of the 2500 pumps. During the past 48 hours we have been draining the 2500 levels of the Belcher and Crown Point mines. The lift pump in the shaft works well, while the donkey pumps have caused much delay and loss of time in lowering.

**NEW WELLS-FARGO.**—Work was resumed on the New Wells-Fargo mine on the 9th inst. After a thorough examination of the machinery it became very evident, from the neglected and rusty condition of the engine, that repairs and alterations would be necessary before active operations could be resumed in the mine. Since that time engineers have been employed in overhauling the

machinery and boilers. This work is now about completed. The first work in order will be a thorough examination and further development of the vein cut in the shaft at a depth of about 75 ft from the surface.

**ALTA.**—Easting timbers and putting in a set of pumps at the 1800 level.

**UNION SHAFT.**—The shaft has been sunk and timbered 9 ft. The 2700 station set is in place, and are casing timber between the 2300 and 2400 stations.

**UNION CO.**—On the 2500 level the joint Mexican winze has been sunk and timbered 13 ft, and the joint Sierra Nevada winze sunk and timbered 13 ft.

**UTAH.**—Since last report the incline has been sunk and timbered 12 ft. The south drift on the 2150 level has been extended 13 ft. The ground in the face of the drift is somewhat harder.

**MEXICAN.**—On the 2500 level the joint Union Company winze has been sunk and timbered 12 ft, and the joint Ghril east winze has been sunk and timbered 13 ft.

**OPHIR.**—On the 2500 level work in the joint California winze has been resumed, and the joint Mexican east winze has been timbered 13 ft.

**HALE & NORCROSS.**—The west crosscut on the 2400 level reached the west wall in 217 ft. Nothing of value was found. Preparations are being made to sink a 3-compartment winze 30 ft north of the 2400 station. The 2100 level is finished and our pump running. The best in the mine is intense.

## ESMERALDA DISTRICT.

**WHAT IS DOING.**—Esmeralda Herald, May 21: While there is no startling development during the week, work has been going on the same as usual, and there appears to be a much better feeling among the miners. On account of the prospect of having a good mill erected, and perhaps two of them, at an early date. The Superintendent of the McIntosh & Barnes received word from his company that they have decided to send him a 10-stamp mill, with all modern improvements, and have contracted for the delivery of the same. It is now a settled fact that the Cortez Co. will commence the building of a mill with at least 10 stamps in a short time. The Esmeralda will be placed on the list with the bullion-producing districts.

Following is a brief statement of the work done at the different mines for the past week: The Cortez has been working day and night. The incline shaft is now down nearly 100 ft, in good ore all the way. The Centennial is opening up well. Work was commenced at the bottom of the incline shaft this week, which shows a steady improvement all the time. The slopes on the upper level are turning out the usual amount of rich ore. The Festoons, located north of the Cortez, is one of a group of mines owned by Ellis Drake. The vein has been stripped a distance of 300 ft and shows good ore the entire distance. The Humboldt West is looking more favorable every day. The crosscut from the bottom of the 100 shaft is now in about 26 ft. The entire ledge shows \$25 to \$30 ore. The Prospects, we understand, is looking much better, and a decided improvement is expected in the drift in a few feet. A shaft is now being sunk in the New Esmeralda through the cap rock at the southwest end of the property to catch the ledge. No work has been done in the tunnel since working the 12 tons of ore, the result of which fully satisfied the owners that they had a good mine.

## EUREKA DISTRICT.

**THE GEDDES & BERTRAND.**—Sutcliffe, May 21: Mr. Clark, Superintendent of the Geddes & Bertrand mine, was in town last night. He has got matters in pretty good shape to prosecute the work of development. Among other things, a new pump reaching down to the 350 level has been put in. There is a fine body of ore on the 75 level. A drift has been started on the 150 station, to cut the ore found above. The drift is now in 40 ft and is looking promising. It is expected to tap the ore within a distance of 30 ft more. As soon as the mine shall have been developed, reduction works will be constructed to treat the ore on the ground. Mr. Clark is an excellent miner and manager, and we have no doubt that there is a bright future ahead for the Geddes & Bertrand.

## LEWIS DISTRICT.

**MILLS RUNNING.**—Silver State, May 21: George Berger, who has been on a business trip to Lewis, informs us that there are two mills—one of 15 and the other of 10 stamps—running steadily in the district. Some 50 men are at work on the 40-stamp mill. Henry Vogt is putting up a brick kiln of 150,000, and when that is finished he intends to build another one. Barney Rice is painting and Doc Alder is running a restaurant. There are three hotels, three stores, two restaurants and five saloons in the place. Several new buildings are going up, and the middle town is being removed to the lower town. The Star & Grove employ 50 men; the Highland Chief, 45; the Betty O'Neal about as many more, and in the whole district some 300 men are at work. Everybody seems to be at work, and the town has a very lively appearance.

## ARIZONA.

**MINERAL CREEK MINES.**—Pinal Drill, May 18: D. B. Spangler, from Mineral Creek camp, near the Gila river, was here this week buying burros, camp supplies, and hiring men to work. This gentleman is a member of the Pinal Copper Co., whose works are in Pinal county, organized under the laws of California, having their office in San Francisco. The company commenced operations about four months ago by securing in quite a number of valuable copper mines, among which are the Monroe, Ray, Esperanza, National, Tibbets, Ida Bell, Green Mountain and Reed. There are several others all having more or less work done on them. The Reed alone has produced 150 tons of ore at a cost of \$2,000 for development, and the Monroe shows a vein of about 4 ft of very fine copper ore, while the average assays from these mines show 25% copper. The new smelter is of 30 tons capacity, and was started up last Wednesday. It has a water jacket, and is similar to the Copper Queen, of Tombstone district. There are 500 tons of ore at the smelter taken from the different mines. These reduction works are about 13 miles from Pinal. The mines are about 13 miles. The route is by the Bauman mine. Eight miles of road has been built by the company, six of which are towards Pinal, reaching Walnut Grove. Fifty miles of road are now being built, there have been 80. There are increasing their forces.

**PROSPECT DISTRICT.**—The Gem mine is yielding good ore. The mill is running and proves satisfactory, and regular work will now go on. This property belongs to the Wide Awake M. Co. They have expended \$40,000 to \$50,000 for work, and have paid for everything as they went along, and have money in the treasury for what they want. The Silver King mine is working over 100 men. On other mines in the immediate vicinity over 500 more miners are employed. A large number of men are awaiting the completion of the hoisting works at the Eastland, Bilk and Nowry, for employment. The usual miners' wages, \$4 per day, is paid. There are 3 teams with 16 mules to each, hauling 60 tons of Silver King ore to the mill daily. They are hauling concentrating ore to the mill, as to keep the stamps going, as the road have a quantity of pulp on hand for lixivating. While at Silver King we visited the Eastland M. Co.'s works, overlooking the village. A new office building, convenient to the mouth of the shaft, is completed, and also a temporary carpenter and blacksmith shop. About 40,000 ft of lumber is on the ground for shafting and building purposes. The hoisting machine is being put in place, and the engine, 40-horse power, 600 ft of inch cable. Steam power to sink the shaft 1,000 ft, all will be in full operation in about 10 days.

## IDAHO.

**THE MOTTER LODE.**—Yankee Fork Herald, May 21: The more the Charles Dickens mine is developed the more we see that the great bonanza of the future is here. As the shaft on the summit progresses in depth the mine yields richer ore, and the indications now are, as the rich pay dips toward the east, that the great body of ore is not the one now being developed. A crosscut is being made in the lower tunnel near the face through the foot wall, and is now in very rich stringers, indicating that there is another body of ore south of the ledge, where pay had not been looked for.

Three more men were put to work in the Montana mine during the week. The ore in the lower works is way up, and a good deal of it will be stopped out by the blue pack trains can get to the mine.

**PROSPECTING.**—The snow off sufficiently to admit of prospecting in the high mountains, and now is the time for prospectors to come to the Yankee Fork country. Mines of great value have been found in the past, and there are many more yet to be discovered. But men coming to prospect should bring a few dollars with them, as they may not find mines that will yield well by hand mortar process, as did the Charles Dickens and Montana.

**PLACER.**—Nevada Press, May 15: There is a ripple of excitement on Camas prairie relative to extensive placers discovered last fall on Little Snake creek, 7 miles west from Florence; the ground prospects all the way from 10 to 50 cents to the pan on the bedrock, with color running from the tops of the ridges to the creek bed. The new diggings will be thoroughly prospected this summer.

## MONTANA.

**CLOSTER MINE.**—Cor. Helena Independent, May 21: A better prospect for a thrifty mining camp than the Kloster now presents, is rarely seen. This mine is the property of the Gregory M. Co. A 10-stamp mill has been employed continuously for more than a year in cleaning up the ore from the drifts alone, and although a pump has not yet been stopped, two handsome dividends have already been declared, thus proving an exception to the general rule that a loss is sustained until stopping begins. A 40-stamp mill will soon be put up just below the one now in use. Any one who enters this mine will be impressed with the neatness and security of its timbering. Up to the present time this camp has been isolated, so to speak, owing to the fact that during a part of the year it was almost inaccessible by way of the road from Belmont. Hitherto the only road to it. But the company have about finished a good road to the camp. The new road runs from Silver City by way of the Trinity road along the foothills till it strikes the Little Prickly Pear, thence up Piegian gulch, and around the foothills, approaching the mine from the west.

## NEW MEXICO.

**NEW PLACERS.**—Cor. New Mexican, May 19: The miners at Golden are taking life as they find it, and while the United States is disposing of the land, the miners are developing their own resources. John McKay and Thos. Munns are now engaged in making fire brick, and will soon begin the erection of a smelter for the purpose of working their own ore. J. M. Lucas has started up his arasters. His ore is very hard, and his efforts are an experiment, which the value of the ore alone can determine.

**BLACK RANGER.**—The Olust mine has a pay streak of mineral that will carry in assay samples \$40,000 per ton in gold and silver. It is telluride ore, incased in a large ledge of quartz, and is being worked by one shift of men.

**POVERTY AND BEAR CREEK** have large ledges of quartz carrying high grade ore, but as yet not thoroughly examined. Prospectors are developing.

**TURKEY CREEK** has a post office called Oraeton. Here there are some fine bodies of ore which are well developed, namely:

**THE WASHINGTON**, which has a 70-ft tunnel and 50-ft shaft; there is a large lot of ore on the dump. The Montezuma, a 40-ft shaft, working one shift, has 25 tons of ore on the dump, which mills about \$100 per ton. The Alaska, Yankee Boy and Paster are looking finely and working one shift each. South from Turkey creek, and next in order, are the El Paso and Dreadnought mines, which are excellent properties, being worked with a good force of men.

## OREGON.

**NOTES.**—Democratic Times, May 20: B. W. Huston, of Foot's creek, was in town Wednesday and showed us some neat nuggets of gold taken out of his claim, one of which weighed \$15 and another \$3. He informed us that some of the miners have cleaned up for the season, while others are following suit.

**WILLOW SPRINGS.**—We learn that the ore of the Roton ledge, in Willow Springs district, is not as rich as formerly, though still of a good quality. The company evidently struck a pocket, which seems to be worked out.

**FOORMAN'S CREEK.**—Keaton & Klippel, of Foorman's creek, have cleaned up with satisfactory results. Among other gold taken out recently, were three good-sized nuggets, the smallest weighing \$13 and the largest \$25.

**PUMP.**—Cunningham & Barkdell will put in a pump on the quartz ledge in Blackwell district, as there is considerable water in the shaft—so much so that it interferes with the prospecting. The ore is of a decomposed character, and quite a sum has been expended by means of a hand-mortal.

**MINERS** are winding up the season's work everywhere. The run was over a month short. Chappell & Co., of Star gulch, cleaned up their boxes the other day, with good results. P. T. Ives is on his regular prospecting tour in the Sierrita mountains. John Richards and other parties are likewise engaged there. Frank Towne, of Sterling, informs us that the miners of that section are all cleaning up, as water is falling fast. John Beckner and Jas. Burns have finished cleaning up their work on Mission Flat, with fair success. They talk of emigrating before long. Kleinhammer, Towne & Reynolds, of Sterling, are cleaning up and doing well. They brought 106 oz. of dust to town a few weeks since. Savage Bros., of Rogue river, have about two-thirds of their ditch completed and will soon suspend operations, as the ground is becoming very dry and hard. Sheriff Bybee returned from Waldo this week, have consummated a contract with the Chinese to construct several miles of ditch for the firm he is a member of. Bybee & Fisher are working on the harden of their ditch leading to Big Bar and expect to complete the enterprise in about two weeks. They will then have a fine water privilege. Glen Lin cleaned up some boxes the other day. How much gold-dust he got none but the Mongolian himself knows; but those doing business with him say it was considerable.

**POCAHONTAS ITEMS.**—From a gentleman residing near Pocahontas we learn that the mining season in that district is an extremely productive one, and the prospect for an abundance of water is good. Jack Low & Co., on Ruene gulch are doing well. Nelson & Co., on Salmon creek, have 2 large giants at work. Akers & Co., on Mill creek, have 1 large giant running all the time. Hayes & Co. are working steadily, with good results, on their quartz ledge. Baisley has 3 giants at work, one of them is the largest in the county.

## UTAH.

**SILVER BELT.**—Silver Reef Miner, May 21: A contract has been let to Messrs. Watson & Co. to sink 40 feet on the lower level of the Silver Belt. The completion of this will no doubt go far towards determining the value of properties in that promised land.

**SILVER REEF ITEMS.**—Miner, May 21: Fifty-one men, all told, are employed about the Stormont mines. Henry Thomas, an amalgamator, at the Christy mill, was killed last week by being caught in a belt and carried around the line shaft.

**HIGH SPOKE.**—The work of straightening up and driving the crosscut on 3 still continues, 40 ft of high grade ore having been gone through already. A 218 oz. assay was made from the face of the crosscut and some ore found being the almost unprecedented assay of 50% lead and 200 ozs. silver. The company shipped 11 carloads of their own and 3 cars of the Frisco Co. to the Rio Grande.

**ARTICLES OF INCORPORATION.**—Articles of incorporation have been filed in the office of the Secretary of State in New York for the purpose of purchasing and working the Cerro Oord, Minnesota, and five other mining locations at Frisco, Utah Ter. These mining properties, now negotiating, cover the notable Cerro Gordo silver hill, near the celebrated Horn Silver mine in southern Utah, and are chiefly owned by R. F. Derickson and E. E. Wood, of Chicago, Ill.

## THE MINE-JUMPING SEASON OPENS UP BRISKLY IN THE BLACK HILLS.



### What the Tourist May See.

The visitor who now turns his eyes upon the California landscape sees the height of its loveliness. It is true that in some parts the yellow of summer ripeness is stealing in upon this scene, but taking the State as a whole it is in its loveliest dress. Fortunate are those who now look upon it. It is the peerless time when earth and air and sky play their sweetest parts, until house walls become prisons and roofs a burden. It is the time when California goes out of doors.

Visitors will be warned, no doubt, that the many hues of flower-flecked fields, which now entrance their vision, will fade away, and that the landscape will come beneath the reign of dust and desolation. To a degree this is true, though not to the extent it once was. The increase of orchard, vineyard and timber areas, the spread of forage plants constantly green by irrigation are doing much to break the old monotony of summer browns and yellows.

While strangers are prone to bewail the short-lived green of our landscapes, they should not forget that it is from the death of our natural verdure that comes the life and prosperity of the greater portion of our people. The drouth which covers the midsummer traveler with dust is the secret of the successful harvesting of our immense grain crops. With an Eastern summer, grain growing on the scale now practiced would be impossible. And if the earlier drouth is thus salutary, the continuance of it is not less so, for it gives the fruit grower his opportunity. Cloudless skies from September to November are the secret of full success in our vineyards. Without them the ten-ton yields of wine grapes would be partly sacrificed, and our vigorous raisin industry would be impossible. Therefore, mourn not the death of the green, as one mourner without hope; for as we have said, it is the key to the prosperity of a number of our agricultural industries.

It is to be expected that many who come for a sojourn in California do not seek alone the beauties of the landscape, but desire as well an acquaintance with our cultures. Those who come from Eastern agricultural districts will perhaps be pleased to see the specialties which engage their attention at home. Therefore, perhaps a running directory of the regions where each may be found, will be of avail to some of our new readers. Of course, to accurately direct attention to all localities where certain industries have taken root would exceed our space. We can but point to the localities where most of a thing may be sought.

Our greatest wheat fields may be seen in the San Joaquin and Sacramento valleys and in Monterey, Ventura and Los Angeles counties; barley in immensity in Los Angeles county, and in quality of Chevalier in the lower part of Alameda county. Corn fields, which the country cannot surpass, are in Los Angeles county; rye in Stanislaus; flax in San Mateo, San Luis Obispo and San Benito; oats in San Mateo, Humboldt, Mendocino and Siskiyou. The greatest amounts of hay are cut in Santa Clara, Sutter, Contra Costa, Tehama and Butte counties. The great pea region is in Humboldt, and beans in Santa Barbara and San Luis Obispo counties. Castor beans reign in Los Angeles county. Potatoes are most abundant in San Mateo, Sonoma, San Joaquin and Alameda counties; sweet potatoes in Sutter, Los Angeles and Yolo counties; onions in Alameda, Los Angeles, San Mateo and San Joaquin counties. Hops are largest in Mendocino, Los Angeles, Santa Cruz and Napa counties; tobacco in Los Angeles, and cotton in Merced and Kern counties. Sugar beets are grown in greatest quantity at Alvarado, in Alameda county.

To find interesting illustrations of California dairying one can hardly go amiss if he hunt from the coast line to the high valleys of the Sierras. The greatest hutter counties are Marin, Sonoma and San Luis Obispo, and in cheese San Luis Obispo, Sonoma and San Benito lead, with Marin, Santa Clara and San Mateo following. The greatest alfalfa fields may be seen in Tulare county, along the Sacramento river and in Los Angeles county. Los Angeles leads in wool with nearly 3,000,000 lbs., Mendocino and Tehama have half as much and Merced, Fresno, San Luis Obispo and Sonoma counties yield over 1,000,000 each. Honey flows most freely in Los Angeles, San Diego and Ventura counties.

Even to catalogue the fruit regions would require a column. The earliest tree fruits are to be sought in Solano county, and strawberries may be found the year round in sheltered spots from Santa Cruz southward, near the coast, to the State line. In similar localities the tomato becomes perennial and the potato is unvisited of frost. The greatest wine regions are Sonoma and Napa counties in the north; Yolo, Santa Clara, Sacramento, San Joaquin and Alameda in the center; El Dorado, Tuolumne and Placer in the Sierra foothills, and Los Angeles and San Bernardino in the south, with luscious beginnings in Fresno, Calaveras, Contra Costa and elsewhere. The largest raisin vineyards are in Yolo, Sutter, Fresno and San Bernardino, and gnatwart beginnings here and there over the fogless valleys and the genial foothills. Without attempting to specify the hosts of the standard fruits, it may be said that the masses of temperate zone fruits come from Sonoma, Napa and Solano, from the Sacramento Valley region and the foothills, the district around Stockton, and from the beautiful valley west of the Contra

Costa hills, including Alameda and Santa Clara counties, with extensions toward the south and to the coast at Santa Cruz and San Mateo counties. This enumeration is geographical and takes a swing around, with San Francisco as a market center. Beyond this, from north to south, many so-called northern fruits are growing to greater or less degrees of perfection, according to local conditions which prevail. The most that can be said of them in a sentence, is that many fruits are reaching the fullest excellences where it was thought they would not grow at all, and some fail where the best results were expected.

The semi-tropical fruits must be sought in profusion in Los Angeles and San Bernardino counties, with gratifying results already attained in Santa Barbara, Ventura and San Diego counties. Very fine orange and lemon trees in smaller numbers may be found in favorable locations in nearly all the fruit regions of the State.

The great lumber regions of the State lie in two lines along the coast and upon the sides of the Sierra Nevada. Both are of much interest both in methods and materials. See the redwoods in Humboldt, Mendocino and Sonoma counties on the north, and in San Mateo and Santa Cruz on the south. The Coast range is their home. On the Sierra foothills and mountains look for mills working spruce, pine and fir, in Tehama, Nevada, Placer, Butte, El Dorado and Sierra counties.

THE product of the Storey county mines for the quarter ending March 31st, according to the returns to the Assessor, was 21,002 tons, valued at \$426,353, or an average of \$21 per ton, against 49,100 tons, at \$1,615,800, an average of \$33, in the corresponding quarter of 1880. The detailed statement for the last quarter is as follows: Belcher, 1,989 tons at \$33.953; Crown Point, 4,696 tons at \$68.301; California, 3,150 tons at \$63.780; Con. Virginia, 4,818 tons at \$111.506; Con. Imperial, 2,931 tons at \$38.104; Ophir, 217 tons at \$5.174; Savage, 47 tons at \$1.682; Sierra Nevada, 2,286 tons at \$97.463; Monte Christo, 820 tons at \$7.380.

In the suit of the Empires Gold Mining Co. against the Pacific Gold Mining Co., the necessary affidavit and the undertaking on attachment having been filed, Chief Justice Morrison R. Waite, of the Supreme Court of the United States, on the 12th inst. ordered that an attachment issue in the case. The U. S. Marshal made his return on the writ, showing that he had attached the Oaks quartz mine, 1,200x500 feet, on the lode of and adjoining the Empire claim, at Plymouth, Amador county, known as the Pacific Gold Mining Co.'s mine. The action is to recover \$120,000, and the bonds required cover this amount and damages that might result from the attachment.

We see by the *Pioche Record* that during the past eight days a large number of people have left that part of the country, most of them being old timers. Bristol lost nearly half of its inhabitants the other day, all departing in one solid band, feeling gay and happy. This party were destined for the Wood River country. A host of the Piochers have departed for other fields and pastures new. Most of them have gone to Wood River and Montana, while others will search for employment as near Pioche as they possibly can.

BULLIONVILLE SMELTER.—The furnace closed down a week ago and the water-jackets are now being placed in position. The short period that the small furnace has been running the company shipped fourteen car-loads of bullion, which Mr. Frank Godhe stated, was valued at fully \$30,000. The experimenting with the new mill process is still going on, and it is thought that everything in regard to the machinery will be in readiness to start up at an early day.—*Pioche Record*.

ACCORDING to the *Virginia Chronicle*, D. R. Fraser, writing from St. Elmo, Col., says that Comstock miners are scarce and in demand. All that a man has to do is to say that he is a Nevada miner and he gets work immediately. Mr. Fraser remarks, however, that it won't do to lie about it, for there are good miners here from all parts. The wages are from \$2.25 to \$3 per day and board for miners. The tenderfoot get \$40 per month.

THE machinery at the New Wells Fargo mine is found to be in a shameful condition. The parties who last run it seemed to have stopped the engine and walked away and left it without putting a drop of oil into or on any part of it. In consequence it is a mass of rust.

AL. FRENCH writes from Tombstone, Arizona, that the camp is booming, but it is no place for men in search of employment, as there are too many idle men in the place now. One miner can extract as much ore in the mines as four men could in California or Nevada.

THE *Inyo Independent* says that the State Line mine appears to be developing far better than the most sanguine hoped for. Five shafts are being sunk, and all exhibit any quantity of ore, some of it assaying as high as \$10,000 to \$13,000 per ton.

THE Giant Gap company, Iowa Hill, Placer county, have spent \$13,000 in running their tunnel, without having yet reached gravel. But the indications are considered sufficiently encouraging to warrant a continuance of the work.

### Nevada County Mining Camps.

Mining camp is a name applied to towns located in mining regions, or mining districts. It matters not how large a town may be, if it is dependent on the mines in its immediate neighborhood for support. This name originated in 1849-50, and was then applied to all towns located in the mining regions. We use the word "camp" now, in accordance with the meaning as then given to it. Of these camps there are in this, Bridgeport township, eight (not including Montezuma Hill), to wit: French Corral, Empire Flat, Birchville, Sweetland, Sebastopol, North San Juan, Cherokee and Badger Hill.

At French Corral the great Milton mine is located—one of the best mines now worked in this township by hydraulic process. The town contains less than 100 inhabitants, though the school district contains, perhaps, 200 people. In the town proper there is a post-office, water office, a hotel, one saloon and an elegant school-house.

At Empire Flat, a half mile this side of French Corral, there is a store, which supplies nearly all the residents of the Corral with groceries and provisions. It is known as the French Corral store, and is owned by M. Darneal & Bro. It is at Empire Flat George D. McLean and others are running a tunnel to open up their mining ground, which is known to be very rich.

At Birchville, three miles from French Corral, in this direction, there is a large tract of mining ground owned by the Milton Co., which is not now being worked. Birchville contains one grocery and provision store, Geo. B. Newell's, and one very excellent schoolhouse. There was formerly a hotel and a saloon at that place, but at the death of the proprietors, they were both closed up. The building formerly occupied as a saloon, was purchased by Peter Graham, and removed to Sweetland. The town of Birchville proper contains a population of less than 50 people, while the school district contains 100 people or more.

Sweetland is a good sized mining town, situated a little over two miles from this town, on the Marysville road, having in close proximity the Manzanita mine and the famous Buckeye mine. It is a town of considerable importance, and boasts of having two hotels, two grocery and provision stores, one saloon, and one of the finest constructed schoolhouses in the county. The Manzanita mine, close to the town, is one among the best hydraulic mines in the State. Sweetland proper contains a population, including the miners, of about 200 people—men, women and children. It is an old town, the oldest perhaps in the township, except the Corral. It holds its own remarkably well.

Sebastopol is located about one mile from this place, and about half way distant between this place and Sweetland. It contains about 20 families. The celebrated American mine is near this town, and nearly all the male residents of the town find employment at that mine. Sebastopol has no hotel, no saloon, or store of any kind. It has, however, an elegant schoolhouse, at which some 30 or 40 children are receiving an education. The Sebastopol people receive their supplies of groceries, etc., at this place and at Sweetland.

North San Juan, the next town in order, contains a population of about 800 souls, perhaps 1,000 in the school district. It can boast of two hotels, three grocery and provision stores, two dry goods stores, one drug, book and miscellaneous store, two clothing stores, two furniture stores, one bakery, one hewery, four saloons, three tobacco and candy stores, one wagon-making shop, one undertaker, three blacksmith shops, one livery stable, one cabinet-maker, one upholster, four physicians, two attorneys-at-law, one dentist, one lumber yard, five carpenters, one wash-house (Chinese), four dress-makers, one tailor, one horse manufactory, one ladies' furnishing store, one printing office, two fire hose companies, one telephone office, express office, postoffice, one watch maker, one barber shop, telegraph office, and two very fine schoolhouses. Also, one church, and one shoe and hoot making establishment, Thomas Harris, proprietor. The only mine at work on San Juan Hill proper is Bowen & Rings.

Cherokee is a mining camp situated about four miles up the ridge. It, too, is an old town, and at one time was a place of considerable importance. There are no mines of any magnitude being worked in the immediate neighborhood of Cherokee, though the town is located on rich mining ground, and is surrounded by ground that will pay for washing. At Cherokee there are two hotels, one grocery store, one blacksmith shop, one shoe manufactory and a very fine schoolhouse. The population of Cherokee proper will number probably 100 souls. The school district, about as many more.

Badger Hill is a mining camp about two and a half miles from Cherokee, and numbers about 50 people, including men engaged in the English mine, which is located at that place. There are no stores there of any kind, nor saloons. It is, literally speaking, a mining camp, occupied by family residences scattered over a large extent of country. The only mine worked there at present is the English mine. Though the Milton Co. own a large tract of mining ground adjoining the English Co.'s claim.—*San Juan Times*.

SNYDER concentrators are used at Rough and Ready, Nevada county, and elsewhere for saving sulphurets, also for black sand.

### Wood River.

A great deal is being said about Wood River, for and against. Those persons who want to get work there had better read the following article carefully. We take it from the first number of the *Wood River News*, and it is evidently a very true statement of the situation:

As this issue of the *News* will have a very large circulation, we feel it a duty we owe our fellow workmen to state the exact situation of affairs for their class of people on Wood River at the present time, and the prospects of the future. Only a few strong, rich companies have any hold in this country as yet.

The properties they do own show large deposits of rich galena, and a few men can take out enormous quantities. The number of prospectors who have opened claims along the river is vast, but they (the prospectors and owners) are poor. They have no means to pay help with, and the ore they take out has to be shipped, at least, so far as Salt Lake City, and then return, though they will lempy pay, in most cases cannot be expected to always prove satisfactory to the demands of all manner of actual expenses.

In spite of all the *News* can say, we know there will be a great rush to Wood River this spring of the class of people who barely have sufficient means to land them in Bellevue. Only a small proportion of these men will get work at remunerative wages, and they will be of the experienced hands at mining. It is well to think of this before grabbing up your gunny sack full of threadbare clothing, old letters and faded photographs, to seek employment at big wages of a poor people in an unexplored though evidently rich mineral region 150 miles from the railroad ties.

As a matter of justice to the *News* when five months later, perhaps, you are "hoofing it" for the railroad—it may be on scant rations—cussing your luck and the country, please let your memory run back to the time when you perused these lines, and remember that you called us a "bear." As anxious as we are to handle coin, we do not wish to get it by inserting advertisements of "Situations Wanted." When we are called upon to say, "5,000 good miners wanted immediately!" our readers can rest assured that Wood River is booming, and we will welcome the honest laborer heartily, and assure him of getting first-class wages.

It is the opinion of many experienced mining men, who have at different periods visited this region, that for all classes of laborers this will, in time, be a good country, but until there are smelters, mills, and facilities for condensing Nature's crude richness in this vast mineral belt, those who expect to be dependent upon capital for daily labor, had better linger in more congenial climes, and where "spuds and hamfat" are cheaper.

AMERICAN VS. ENGLISH MACHINERY.—A practical miller, writing to the *Glasgow Herald*, expatiates at great length upon the causes which have brought about the ruinous competition of American millers with those of the British Islands. He contends that the English millers have neglected the most important point in this contest for the supremacy—viz., the improvement of their machinery, and that, therefore, the only reason why the American producer can import and undersell his English competitor is that he has the means through his superior mechanical appliances to produce a finer grade of flour at a cost and with an ease which puts the English miller hopelessly in the background. The writer, however, claims that much of the American flour imported into England is sold at an actual loss, and advises his co-workers to adopt the most improved American machinery now in use, and seize upon every new device as it comes from the inventors' hands.

MATTERS AT THE MINT.—The *Carson Appeal* says: "From the way supplies are being taken in at the Mint it does not look as if the institution was to be closed. Yesterday, 22 tons of copper ingots were received from the Ludwig copper mines, while 30 tons are lying at the Mound house, waiting transportation. There are now 2,500 tons of ore lying in the dump of the Ludwig, which will produce 250 tons of pure copper."

THE Director of the Mint estimates the total amount of gold in circulation in the United States (including bullion in the Treasury) at the commencement of last week, to be \$520,000,000, of which about \$264,000,000 was held as Treasury and National Bank reserves, and \$256,000,000 was in actual circulation. There has been a total gain of gold coin and bullion to this country, since July 1, 1879, of \$234,000,000.

SINCE August the Dunkin mine at Leadville has been turning out from \$21,000 to \$33,700 per month, while the expenses for the same time have averaged only \$6,500 per month. The ore now worked nets from \$22 to \$35 per ton, and there is said to be a considerable quantity of ore in sight. The mine is paying monthly dividends with regularity, and has already disbursed \$185,000.

MEADOW VALLEY CO.—The mill of this company at Dry Valley has been running for about six weeks, and during that time Superintendent Duff has paid out to the chloriders and for supplies and labor to the company, \$30,000.



## THE ENGINEER.

## Immense Steamships.

A company has been organized to build a class of express steamers of immense size to run between New York and Milford Haven. Report says the steamers will be 550 ft. long, 45 ft. beam, and that they will draw about 25 ft. when loaded; but these figures must be taken as approximate; as well as the statement that they will carry 5,000 tons of goods and 400 first-class passengers. It is estimated that their speed will be about 23 miles an hour.

No such speed has ever been attained by any screw steamer of large size; and it has only been reached by a very few paddlewheel yachts on rare occasions. The first ship driven at this speed across the Atlantic, will have performed a feat without, for a time, a parallel; and when we hear in mind what a rapid ratio the resistance of a ship increases with each augmentation of speed, it will be seen that the construction of the proposed express Atlantic steamers presents a tremendous problem for solution to naval architects and engineers.

Calculations have been made, which appear to be accurate, and they go to show that engines of 16,000 indicated horse-power, and probably more, will be required to drive a ship of the stated dimensions at 23 miles an hour across the Atlantic. It is very doubtful if the required velocity could be got at all with a vessel with much less than 7,000 or 8,000 tons displacement. Making every allowance for the skill of modern smiths it is considered very doubtful if a trustworthy shaft of the dimensions necessary for such a screw could be made. The *Engineer* says: "Allowing that steel is to be used, and that the shaft will be built upon the most approved principles, we shall find that many portions of it cannot be less than two ft. six inches in diameter by about seven ft. long. Sound forgings of these dimensions have never yet been produced. The weight of such a block would be, when finished, nearly eight tons. It is true that heavier forgings have been made for years, but they have not been solid. We do not assert that a sound crank shaft, with minimum diameter at any place of two ft. six inches, cannot be made; but we do say that no such shaft has yet been made, and that it will not be easy to produce one. Such a shaft might, perhaps, be depended upon to transmit power safely at the rate of 250 horses indicated per revolution per minute. This means 64 turns per minute to provide for 16,000 horse-power, and this velocity implies a great deal more than appears at first sight."

The *Engineer* considers the experiment a very doubtful one, and suggests that their engines and propellers should be of 8,000 horse power each.

LIVERPOOL ENGINEERING SOCIETY.—At the late meeting of this society, a paper on the "Application of Natural Forces to the Production of Motive Power," by Mr. G. C. Thompson, was read, in which the author treated his subject in a general manner, without going extensively into detail, dwelling for a considerable period on the possibility of much mechanical knowledge possessed by the ancients being lost at the present day, citing as a proof, the ruins of Baalbec, where some of the stones employed in construction, according to the author's calculation, must have weighed 840 tons, and required the united strength of 25,000 men to lift into position. Having pointed out some obvious disadvantages in the use of steam and its substitutes, the paper suggested the use of compressed air, to be obtained by automatically utilising the rise and fall of the tide, according to a detailed description and diagram, the main feature of which was the enclosure of 20 acres of coast land, and the formation of a large airtight space, to be acted on by the tide, which, on rising, would pass through the inlet pipe, and force the compressed air through an outlet pipe at the upper and opposite side, when it would become a prime motor. The second portion treated of the utilisation of the wind by means of windmills and pumps for effecting a similar purpose. A discussion followed.

JAMES RUSSEL LOWELL'S TRIBUTE TO THE MODERN ENGINEER.—At the late annual banquet of the Institution of Civil Engineers, the American Minister, in proposing prosperity to the Institution of Civil Engineers, said: "I feel that there are certain relations between engineers and that general civilization of which literature and art can also claim their share, which gives me, perhaps, some claim to propose the toast assigned to me. Naturally, in some respects I confess I am wanting in sympathy with some of the achievements of modern science; yet, with all the world, I must confess that you are the makers and the masters of the modern world, so far as it is visible, palpable, and serviceable to the rest of the world. \* \* \* I think there is no achievement of modern science which so touches the imagination as that narrow bridge for thought which engineering skill has stretched through the profound and silent stretches of the Atlantic between this continent and the other. Nothing touches the imagination more than the way in which the modern engineer has realized that dream of the ancient philosopher—that the earth was a sentient being. It has made mankind contemporaries in a sense in which they were never contemporaries before."

## USEFUL INFORMATION.

## Luminous Paints.

According to the *London Building News*, luminous paint is getting into quite extensive use in England. Mention is made of offices coated with the paint, which give great satisfaction to the occupants. The effect is that of a subdued light, every object in the room being clearly visible, so that in a room so treated one could enter without a light, and find any desired article. The luminous paint is excited by the ordinary daylight, and its effect is said to continue for about 13 hours, so that it is well adapted for painting bed-room ceilings, passages that are dark at night, and other places where lamps are objectionable or considered necessary. For staircases and passages a mere band of the paint will serve as a guide, and costs but a trifle. For out-door purposes the oil paint is used, but for ceilings and walls the luminous paint, mixed with water and special size, can be used the same as ordinary whitewash, and presents a similar appearance in the daylight. By the recent discovery that it can be applied as ordinary whitewash considerably expands the field of its usefulness. Sheets of glass coated with the paint are in use in some of the vessels of the navy, at the Waltham Powder factory, at Young's paraffine works, and in the spirit vaults of several London docks; and now that, by increased production and the use of water as the medium, its cost is reduced by one-half; it will probably be extensively used for painting walls and ceilings. The ordinary form of oil paint has already been applied in many ways—to statues and busts, to toys, to clock faces, to name-plates, and numbers on the doors, and notice boards, such as, "mind the step," "to let," etc. The paint emits light without combustion, and therefore does not vitiate the atmosphere. Several experimental carriages are now running on different railways, the paint being used instead of lamps, which are necessary all day on account of the line passing through occasional tunnels.

COPYING DRAWINGS.—By a method patented by M. Joltrain of Paris, it is claimed that copies of drawings having nearly black strokes on a white ground can be made by the following sensitising mixture: Gum, 25 grammes; chloride of sodium, 3 grammes; perchloride of iron at 55° B., 10 cubic centimeters; sulphate of peroxide of iron, 5 grammes; tartaric acid, 4 grammes; water to fill up to 100 cubic centimeters. The developing bath may be a solution of ferrocyanide of potassium, red or yellow, acid or alkaline. The printing is done in the ordinary way, and the developing in a bath of red or yellow prussiate of potash. After washing the proof is put into an acidulated bath, which darkens the lines to an indigo tint, and is then again washed and dried.

PAPYROTYPE.—THE LATEST DECORATIVE NOVELTY.—Under this name the *London Building and Engineering Times* describes the latest novelty in products for decorative treatment of interiors. Papyrotype is neither paper or tile, but a tough, pliant fabric, in substance like leather, though artificially composed of prepared materials which result in a non-conductor of heat and sound. These quasi-tiles may be advantageously employed for wall or ceiling decorations simply by the aid of glue or other cement, and are readily cleaned by the ordinary dust brush. The decoration is applied in one or more colors to straight or curved lines, either flat or in high relief.

ASHES AS A SUBSTITUTE FOR EMERY.—We copied a paragraph on this subject a week or two since. And now comes a correspondent in the *Iron Age* who writes as follows: "A paragraph has been going the rounds of the papers that some one has discovered in anthracite coal ashes a substitute for emery. As it may save many from going to the trouble of washing ashes to try this last discovery, I thought I would write you to say that as the ashes in question contain only finely divided silica, which can be bought crushed, graded and bottled to any degree of fineness for one cent per pound, \$20 per ton, it does not look as though it was worth the trouble and bother of extracting it from refuse of any kind."

MOUNTAIN mahogany is a wood indigenous to this coast. The trees do not grow large; one with a trunk a foot in diameter is much above the average. When dry the wood is about as hard as hoxwood, and of a very fine grain. It is of a rich red color and very heavy. When well seasoned it would be a fine material for the wood carver. In the early days it was used in making boxes for shafting, and in a few instances for shoes and dies in a quartz battery. Used as a fuel it creates intense heat, it burns with a blaze as long as ordinary wood last, and is then found (almost unchanged in form) converted to a charcoal that lasts about twice as long as that of ordinary wood.

LUBRICATING GEARS.—Where a mill is driven by mortise gearing it has been recommended to use a mixture of pulverized chalk and linseed oil for lubricating purposes. It is said that this mixture is much better for wooden cogs than oil, tallow or flour. The chalk for this mixture should first be pulverized and then sifted with a fine sieve.

## Painting on Brown Paper.

Painting on brown paper is now all the rage. Concerning the new craze the *London Queen* says: "Brown paper of the darkest shade and thickest texture, and gray paper of a coal granite tint are just now in demand as materials for painting upon for dados, panels, cornices, and book-covers and other things. They give a background on which the light and shade are at once relieved; and while gray paper is the softest, brown paper, partly by the contrast of the rough surface, gives the most relief. The best brown paper for the purpose, is the stout, continuous kind used by the paperhangers and upholsterers for hacking, which can be had at all the carpet warehouses in any quantity. The colors are oil paints in tubes or water colors, well ground with Chinese white, used with fine bristles or red sable brushes.

Another method is to lay on the Chinese white, well ground to the consistence of thin cream, and when it is dry to paint over it with ordinary water colors. Red sable brushes are also the best for both the latter. Minute finish is out of character with the kind of work; the effects should be put in broadly, and the designs be distinct and of few large objects. In connection with this subject it may be appropriately mentioned that the "Angry Swans," two of the finest of Turner's drawings, which are on exhibition at the National gallery in London, are painted on common brown paper, which had been used as the wrapper of a parcel.

A PULVERULENT LUBRICATING MATERIAL for axles, shafts, etc., is prepared by Herr Drechsler, of Dresden, thus: The finest graphite powder is worked up thoroughly with egg-white, or yellow, or both, to a firm dough, which, in a metallic vessel, is kept in a vessel of boiling water till the egg-white and yellow are fully coagulated. The mass is then dried at 90° C., so thoroughly that it can be bruised or stamped to powder. This powder is applied to a slowly-revolving axle or shaft till axle and bush take the peculiar dark shine of graphite.

HIGH UP.—The crown of the hat of the statue of William Penn, which is to surmount the tower of the new public building of Philadelphia, will be just 525 ft. above the pavement. This is ten ft. and one inch bigger than the highest towers of the Cologne cathedral.

TO MAKE MODELING CLAY.—Knead dry clay with glycerine instead of water, and a mass is obtained which continues moist and plastic for a length of time. This removes one of the greatest inconveniences that is experienced by the modeler.

## GOOD HEALTH.

USE OF THE EYES.—The man who avoids excesses of every description has a fair chance of retaining his eyesight until old age sets in. A time comes to every one when the physical powers begin to decay, and then, unless the brain has been kept active and recipient by exercise, there is nothing left to live, and the man perishes. We say that he died of gout, or over-eating, or of kidney disease, or of the failure of the particular organ which was the first to exhibit symptoms of the approaching end. In reality he has died of stupidity, artificially produced by neglect of the talents with which he was endowed. That which is true of the organism as a whole is true, also, of its parts; and the eyes, among others, are best treated by an amount of systematic use which preserves the tone of their muscles and the regularity of their blood supply. Acuteness of sight is aided by the attention bestowed upon objects within the range of vision. In people who cannot read the sight is far from acute. I have even had reason to think that the wives of such men were indebted to their household needle-work for the maintenance of a higher standard of vision than that of their husbands; and I have no doubt that idleness of the eyes, if I may use such an expression, is in every way hurtful to them, and that proper and varied employment is eminently conducive to their preservation and efficiency.

SALICYLIC ACID.—Experience has shown that salicylic acid should be employed with care for internal use. It is soluble in only a very limited number of ordinary solvents; hence it is liable to crystallize in the stomach under certain conditions, from which serious consequences may arise. It should be taken internally only under the advice of a physician. It is considered so dangerous in France that the French Minister of Commerce has issued a circular to the prefects instructing them to forbid the sale of any article of food, solid or liquid, containing salicylic acid, or any compound of it. The attention of the sanitary authorities has been called to the danger to public health by the use made of this substance for the preservation of food, and M. Tirard has had a thorough analysis of its properties made by the Consultation Committee of Hygiene. The result of the committee's examination is that the acid is injurious to health, not only on account of its direct effects on the system, but also indirectly, by permitting the fraudulent introduction into food of other "deleterious, or at least unwholesome, substances."

THE BRAIN WORKER.—So long, says a medical authority, as the brain worker is able to sleep well, eat well, and take a fair proportion of out-door exercise, it is not necessary to impose any special limits on the actual number of hours he devotes to his labors. But when what is generally known as worry stops into complicated matters, when cares connected with family arrangements, or with those numerous personal details which we can seldom escape, intervene; or when the daily occupation of life is in itself a fertile source of anxiety, then we find one or the other of these three safeguards broken down. Probably the man of business or the successful lawyer fails to shake himself free from his anxieties at night, and slumber becomes fitful or disturbed. The nervous system, unsettled by the mental strain, brings about various defects in nutrition, and then we meet that depression which is the chief misery of the overworked.

THE ENERGY OF THE HEART.—We may form some conception of the enormous energy of the human heart when we reflect that a good climber can only ascend 9,000 ft. in nine hours, that is, can only raise his own weight 1,000 ft. in an hour, that is, of course, continuously for any length of time, while the work done by the heart is equivalent to raising its own weight (10 ozs.) 13,860 ft. high; and we may put this even more strikingly by pointing out that the most powerful engine ever made by men, the "Bavaria" locomotive of the Vienna and Trieste railway, can only raise itself through 2,700 ft. in an hour; that is, its energy is less than one-fifth of that of the human heart (Houghton). Of course, the actual amount of work done, both by engine and climber, is much greater than that done by the heart; but relative to weight, the energy of the heart far exceeds that of the other two.

LACK OF AIR.—Some workmen think themselves "tired," when they are only poisoned. They labor in factories, breathe air without oxygen, and in an atmosphere of death. They are, too often, allowed to smoke, and thus add fuel to the flame that is consuming them. They knock off work "tired" and listless, when they are merely weakened by foul air and made dull and heavy by an atmosphere charged with disease. They keep the windows shut and close the door on health, while they lift the gratings of the tomb by breathing and re-breathing the poison from their own lungs, and the floating particles of matter about them. Open the windows—let in the sunshine and the breeze, stop smoking, and you will soon find that it is the poison of confinement, and not labor, that wears and tires.—*Montreal Herald and Star*.

ALCOHOLISM A PREDISPOSING CAUSE OF CRIME AND EPILEPSY.—In a recent number of the journal with the awkward title *Brain*, Dr. Clarke has published some tables of statistics, which lead him to the conclusion that "alcoholism of parents is a predisposing cause of crime and epilepsy in their children." Forty-four per cent. of the epileptic criminals were the children of drunken parents. The proportion of epileptic and insane relatives is found to be very much greater with criminals than with ordinary epileptics. The convictions for hasty are three times as numerous among epileptics as among non-epileptics. The statistics show that the amount of crime, as indicated by the number of convictions, is greater among epileptics than among ordinary criminals.

CURE FOR WARTS.—A correspondent of the *Scientific American* writes as follows: Some years since a corn doctor advised me to use coal oil. My hands were covered with them. Having little faith I tried it, putting a drop on each of common kerosene and letting it absorb; where there was a hard crust, scraping it to facilitate absorption. In a fortnight after twice daily treating them, they began to lessen, and finally disappeared without scar. Then the right hand, in part, leaving one which remained after all others had passed away, and then that one. Have advised others to try it, with like effect on persistent use. Simply softened the top, dropped the oil on, and let it be for some minutes to absorb.

PITTING OF SMALLPOX.—Dr. Swimmer advises a mask to be formed of very pliable linen cloth, leaving apertures for the eyes, nose and mouth. The inside of this is to be smeared with one of the following liniments. 1. Carbolic acid, 4 to 10; olive oil, 40; and prepared chalk, 60 parts. 2. Carbolic acid, 5; olive and pure starch, of each 40 parts. 3. Thymol, 2; linseed oil, 40; and chalk in powder, 60 parts. The mask should be renewed every 12 hours. Compresses impregnated with one of these mixtures may also be placed on the hands, and on any parts of the face with which the mask does not come into exact contact.—*Gazette des Hôpitaux*.

THE BEEF JUICE FUROR.—In the present furor for fluid beef juice, says Dr. Fothergill, the necessity for starchy matters is being quite overlooked, or to be very safe, underestimated. These meat products furnish—the best of them—little glycogen or animal starch, and yet that is the fuel food of the body *par excellence*. We must be guided by rational knowledge, by physiology and not by fashion, in our dietetics. When there is very feeble digestion, then the digested milk and milk gruel advocated by Dr. Roberts is to be employed.—*The Practitioner*.



# MINING SCIENTIFIC PRESS

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G. H. STRONG.

SAN FRANCISCO:

Saturday Morning, May 28, 1881.

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## Passing Events.

The principal news of the week, from a miner's point of view, is that the big hydraulic pump on the Comstock broke down, and it will take two months to repair it. This is a serious accident, and one much to be deplored at the present time.

The news from Alaskan mines, which we give in another column, is not especially encouraging for those who have gone up there. But it may be taken as a general proposition that all reports from newly discovered regions are more or less exaggerated. Those persons who have had experience always accept such rumors with a "grain of salt."

The news of the cave in the Black Hills mines was received with regret, but the disaster was not so bad as was at first reported. Ground was broken this week on the Black Hills and Custer City railroad. The road will run from Deadwood to Custer, with a branch to Rapid City. The total distance is about 70 miles. It is being built by the Homestake M. Co., principally to furnish timber and fuel for their mines and mill.

From Wood River come somewhat contradictory reports, as was to be expected. It is said, however, to be a good "poor man's country." That is, the metal is near the surface and easily mined. It is, however, like any new camp, a poor place for men to go, who are without means and dependent for their support on daily labor.

The season now being fully opened, prospecting operations are going on in all directions. Arizona and New Mexico both attract numerous miners and prospectors, owing to the fact that large extents of new territory are here open. We may expect to hear from this on reports of new districts being formed, new strikes, etc.

## Wood River.

The recent reports from this new mining district are of a very contradictory nature. When the earliest news came of the discoveries made last fall in the Wood River country, the facts were undoubtedly highly colored, as is apt to be the case with all new mining regions; and latterly we hear accounts carrying quite as decided a bias toward the other extreme. The truth, as usual, lies between the two. Many, who had been carried away by the enthusiasm aroused by the earlier reports, have this spring flocked from the older mining camps in every part of the country to Wood River, and inaugurated a "rush" which promises to rival those of Reese River and White Pine. They found, on reaching their destination, that all the more promising "prospects" had been located by the first comers; that work was scarce, as compared with the number seeking employment; that the expenses of living were high and accommodation limited. So, of the throng which has been pouring into the Wood River country since the opening of the season, not a few have returned to their former camps in a disgusted frame of mind, and inclined to think and say that the new mines are a humbug. A number of papers published in the mining towns have obtained their information from this source, and have spread it widely; without, however, checking the rush. In spite of all discouragement, it is safe to say, that not less than 10,000 men will have been attracted to Wood River during the coming summer and fall.

We will briefly state the leading points of interest to those who may still have in mind a pilgrimage to this latest strike. The Wood River country embraces a tract of about 45 to 50 miles in length by 25 in width, lying on both sides of the stream from which it takes the name, and about the head waters of numerous feeders to the main river. It is in the center of Alturas county, Idaho, and nearly in the center of the Territory. Immediately south of the Wood River country are the great Snake River lava beds, which extend through Idaho and neighboring Territories for some 800 miles. The river runs from north to south, emptying into the Snake. On the north and west of the district are the Sawtooth mountains, in which several good camps had been struck previous to the Wood River excitement. The country composing the district, or rather series of districts, is of very varied character. About Bellevue, the most easterly and principal town, the valley is broad and quite flat, the mountains forming the sides of the valley converging toward the north, but split up by innumerable gulches. At the head of this valley the country becomes more rugged, and at Galena and to the north is exceedingly grand and picturesque. The altitude varies from 5,500 ft. above the sea level on the prairie land to 9,500 ft. at the northern portion of the district, some of the mines, as the Eunice and Gladiator, being situated at an altitude of 10,000 ft. above the sea level.

The climate is not so severe as is generally supposed, and is certainly not to be compared in point of cold with that of Yankee Fork or Cariboo. At Bellevue, where the greater number of last year's miners and prospectors wintered, the weather may be considered mild in comparison with that of many mining camps, the altitude being lower than most silver districts. The average fall of snow at this point may be placed at three feet for the season. Communication was maintained regularly throughout the past winter. What is known as the open season begins about April 1st and continues till December. During the early spring, however, the roads are heavy and transportation difficult. The summer is very pleasant.

Wood River is reached through two main routes. One, the more frequently taken by those having their own teams or saddle animals, is by way of Kelton, Utah, on the C. P. R. R. The other is the stage route from Blackfoot, on the Utah Northern R. R., a branch of the U. P. R. R., connecting with the latter at Ogden, Utah. The distance from Blackfoot or Kelton is nearly the same, but the former route is the easier one. Freight is brought in from either point at about the same rate, which was 2½¢ to 4¢ last season, including carriage over the Utah Northern R. R. from Ogden to Blackfoot. The fare from San Francisco to Kelton is \$30 emigrant—time, three days; first-class, \$53—time, two days. From Kelton to Bellevue it is 150 miles by stage; through in 36 hours; fare, \$25. Through freights from San Francisco to this place range from 1.65¢ to 4½¢ per lb.

Wood and water are abundant. In the lower portion of the Wood River country there is little timber but cottonwood, but further north are forests of fir, spruce and pine, furnishing excellent mining timber.

Bellevue is undoubtedly destined to remain the principal town, being the natural outlet of the country; and it has grown with mushroom rapidity. Further north are the towns of Hailey, Ketchum and Galena, which are nearer the mines; while a number of smaller camps are springing up at intervals throughout the tract described.

The ores of the district are argentiferous galena—a large proportion of which is the steeley variety containing antimony; carbonate of lead associated with bromide and iodide, and occasionally anglesite. The galena shows but traces of gold as a rule, but carries from 60 to 350 ozs.

of silver per ton. The shipments to the Salt Lake smelting works last year averaged 125 ounces per ton; and, in fact, almost all the galena in the country carries sufficient silver to pay for shipment. The assays of the carbonate ores are very variable, running from traces merely up to very high figures; and the value of the ore cannot be readily determined by the eye, reliance being placed on close assaying. The country rock embraces a wide range of varieties, limestone and shale being the most common, while porphyries of several types and granite are also found as the habitat of the lead deposits. The veins, as with all lead districts, are irregular and generally narrow, but widen in places to extensive chimneys, such as those of the already famous Bullion, Idahoan and Scribner mines.

It is expected that two custom smelting works will be in operation this year. This will be a great advantage, especially to owners of small mines.

Quite an important system of business operations has already sprung up. Freight and stage lines, the furnishing of mining supplies, etc., are naturally leading branches. The opportunities for establishing these, we think, have been pretty well exhausted by the more enterprising first-comers. Still, as the district has undoubtedly a life of at least three years before it, judging from what has been already uncovered, there may still be room for further business ventures.

At present, the largest mine-owning interest of the district is centered in Salt Lake City. Eastern buyers are, however, coming in, while several of our San Francisco mining men have had an eye on the Wood River country for some time, and have had their experts in the field, picking up promising claims.

In conclusion, we would strongly urge upon all who may think of going to Wood River to make ere before starting that when they have arrived they will have means of subsistence for many months. The history of these mining "rushes" has been a painful one, but ever repeat itself. We hope that in this case there will be fewer disappointments, less privations. There will be work for skilled miners, smelters, carpenters and blacksmiths, but little for the common laborer. While wages are high, the expenses are still higher, certainly offsetting the increased earnings. If the country fills up as rapidly as the indications show, there will, we fear, be an over-crowding, just as has happened at Tombstone and other new camps, and many will find it harder to find employment in Wood River than at their own homes. We trust this advice will be heeded.

## Zone or Lode.

When the case of the Eureka-Richmond mines was brought before the U. S. Supreme Court, Mr. Thos. Wren, in his argument for the Richmond Con. said: "The Court (below) finds that this entire zone is a lode; and the whole case rests, in my judgment, upon that question. But if that zone is a lode in the meaning in which those terms are used in the Acts of Congress, then the case, perhaps, should be affirmed. But if that zone is not a lode in the sense in which those terms are used in the Acts of Congress, then there is nothing found outside of that upon which this judgment can rest."

The decision of the Supreme Court does not definitely answer Mr. Wren's question, but it says: "Whether the limestone was or not, within the meaning of the Acts of Congress, and the understanding of the miners, a single vein, lode or ledge, it was all mineralized or metal-bearing rock as distinguished from the barren walls in which it was inclosed. It descended into the earth on an angle, and unless parties in working it could follow its course as it went down, they could not avail themselves to the full extent of the wealth it contained. When, therefore, we find parties contending about their rights to its possession, and finally agreeing on a line of division between themselves which shall be continued downward toward the center of the earth, the conclusion is irresistible that the line was to be extended downward through the property in its course toward the center of the earth."

Prof. R. W. Raymond (who was one of the experts), commenting on this clause in the decision, says: In other words, whether this zone answers the set definition of a lode or not, it is bounded like a lode, it dips into earth like a lode, it must be followed in working like a lode, and boundaries drawn across it, to settle titles and end disputes, must be extended just like boundaries drawn across a lode. We do not wonder that the august tribunal adds: "This disposes of the case."

In avoiding to give an unnecessary definition of a lode, which might be used as a basis of verbal quibbling in some future case, the intention of the court appears to have been to leave all other contests to be decided, as this has been, on their merits.

**GOLD MOUNTAIN.**—Paul Frisk, in the Grantsville Bonanza, speaks favorably of the outlook at Gold Mountain. Of course things are a little dull at present, but when water is brought in there will undoubtedly be a boom that will cause a genuine excitement. A good deal of money is expended on dead work, and it will take time to open the mines and get the mill in running order. When everything is fixed, then look out for brilliant shipments.

## Holding Ground with Prospect Holes.

Not in one mining camp, but in many, is there a strong feeling against the habit of men coming along and digging a dozen or two holes which are nothing but holes, but never more, and which keep other men off of unprospected ground. This thing is usually done by a lot of greedy fellows who sink holes and hold claims, half the time with no signs of mineral, but who hope to sell to others, or to hold ground which others will make valuable. There have been numbers of instances where this has injured the district. In fact, it retards development in every camp. We notice the statement of a correspondent at Baldwin's camp, New Mexico, which he says is being slowly developed. He says:

"It was first opened by some tenderfoot who put down a great many holes where there was not the least sign of mineral. These stupid efforts had the effect to stop the development for a time. Miners of experience are now at work there, and two or three genuine leads have been recently opened which bid fair to prove that the fine formation of these mountains really means something."

In Colorado, they are having a great deal of trouble with the practice. At Argentine district a lot of miners finding "slide-rock" holes all over the district and noticing no work was being done on them, went to see the tenderfoot locators, telling them to work the holes or they would. A few days passed and no work being done, the men jumped the claims. Shooting ensued, and one man was killed and a number wounded. Mr. Joseph Bush, a pioneer prospector of the district, explains, in the *Leadville Democrat*, the cause of the difficulty, as follows:

The tenderfoot, he says, makes his advent in a district and sinks a multiplicity of holes in "slide" rock and then asserts and holds it as a valid claim. If a tenderfoot hole, he added, was on, or in a true fissure vein and mineral in place, it would certainly be all right in the eyes of the law; but on the other hand the true prospector and experienced miner is bound to denounce the 60 and 90 day regulation in reference to assessment and recording. "For instance," said he, "a man goes into a district the middle of June and makes a hundred locations, claiming 90 or 60 days for developments. He is a tenderfoot and has an idea that these holes can be disposed of for mines. He permits them to lay undeveloped. The experienced miner comes into the country, who would work them, but he sees the evidence of location and passes on."

"Finally the claim is forfeited by the tenderfoot, and the miner is cheated out of a year's work, and the development of the district retarded and seriously injured. If a conscientious prospector locates a claim, he settles down and works diligently upon it, but the emigrant of to-day displays an aversion that is fearful to behold. The legitimate prospector that has worked for years, made fortunes and lost them, concentrates his efforts within a fair territory, and, not wanting a whole mountain, will confine himself to one place, thereby giving others a chance to 'try their luck with a pick.'"

This matter is causing much dissatisfaction among the prospectors. As it is now, there is a resolution among the miners, initiating steps toward an abolition of the 90-day policy.

## Copper.

The business of copper mining is now rapidly reviving on this coast. The discovery and development of extensive copper mines in Arizona, has turned attention to many neglected properties in this State, being known, but never worked to a profit. It has been proven that ore could be worked here as well as abroad, and there are now several furnaces running in Arizona and making money. We expect to see, within the next few years, a very general reviving of this extensive interest. There are hundreds of good copper mines in California, which, if provided with suitable metallurgical appliances, would pay well. Cement copper in this city is now worth 15½ cents for 100 fine.

In England the price of copper has declined of late. On the 30th ult. quotations for good ordinary brands were £58 15s. to £59 per ton; ore, 12s.; and regulus, 12s. 3d. per unit. Chile exports to April 26th equal 15,148 tons fine. Stocks of west coast produce were equal to 32,060 tons fine against 32,301 tons on the first of the month. The quantity of Chile copper about as advised by mail and cable to the 22d of April, is 13,246 tons, against 10,890 tons on April 1st. Stocks of other than Chile produce are 15,981 tons fine.

The following are the Board of Trade returns of imports and exports for the first three months of the following years, (estimated) in fine copper:

IMPORTS.	1879.	1880.	1881.
Ores.....	2,649	8,842	1,946
Regulus.....	1,891	1,093	326
Precipitate, etc.....	3,954	4,681	6,132
Bars, Ingots.....	11,697	10,574	7,170
Pyrites.....	3,308	4,603	8,424
Totals.....	23,399	24,713	19,038
EXPORTS.	1879.	1880.	1881.
Eng. Copper, wrought & unwrought.....	7,369	7,562	7,670
Yellow Metal.....	8,373	3,670	3,324
Foreign Copper, unwrought.....	3,570	4,623	2,043
Totals.....	14,802	15,756	12,642



### The Buckland Buggy.

We give an engraving on this page which illustrates George G. Buckland's buggy gear, patented through the MINING AND SCIENTIFIC PRESS Patent Agency March 15, 1881. The gear, as the illustration shows, is exceedingly simple and elegant, and its durability and style of finish is such as to recommend it to all who use it. The small views on the upper corners of the cut show the form of clip for fastening the spring to axles.

There are no working joints in any part of the gear, and therefore nothing to ever wear or rattle, making it completely anti-rattling, something hitherto apparently unattainable. The axles being attached to the springs can easily give when the wheels strike any uneven ground and can, therefore, lessen the shock to horse and driver; the wheels thus giving a little have their durability increased. They spring down square, without any side or tilting motion.

This gear can be made entirely of iron and steel, so it is perfectly durable. The springs run from one axle to the other. Therefore they are long springs and ride very easy, and can stand very hard usage. Having no complicated forgings or castings, anyone can repair them.

These buggies have been found well adapted to rough and rocky streets. There being no working joints on this gear, it is apparent at once that it springs down square as a level. A person may stand outside of the body on one step, and yet be unable to tilt it sidewise.

The inventor, Mr. Geo. G. Buckland, of Tulare City, California, has had many years experience as a carriage-builder, and knew where the weak points of buggies existed. He has therefore done away with weak points in this gear. The king bolt is screwed up into the head block and has a jam nut on top, which keeps it from ever working loose, and can easily be tightened up if it wears.

The middle cross frame brace is all in one piece. One great beauty about this simple gear is that it will answer for either buggy or huckboard. Hence a person can change a huckboard into a handsome buggy in a few minutes by adjusting only four bolts. Said bolts can have tail nuts, and would need no wrench or hammer to change huckboard to buggy, which is an item of special worth to all residents of the county.

This is a feature entirely new in carriage building, this susceptibility of change from huckboard to buggy and vice versa. It has never been done, except with this patent gear. It has been found by experience that the form of spring shown is best, for the simple reason that the springs run in the direction of the strain, and do not receive the sudden or dead shock that comes to solid-coupled wagons or buggies. In the form of gear described the wheels give from any shock or jar, and do not strike a stone or other rough ground, hence the ease to the spring and to the person riding.

In these buggies the body may be set either high or low; it may be set in between the springs or on top of the springs, or above the springs as shown in the cut; the springs may be set as close together as desired, by using a short headblock. They are clipped solid in every respect, and can never get out of square or spring down unevenly. The springs may be made in any shape; they can be made straight or be bent up or bent down for phaetons and low wagons or buggies, or be made any desired length, or any width of steel be used in the manufacture of the springs. A wood or iron headblock may be used. The axles may be made either with wooden stocks or the plain iron axles.

**ATTEMPT TO COMPROMISE.**—It was because the Richmond Con. crossed the compromise line and worked the renowned Potts chamber, that the Eureka-Richmond suit was inaugurated. The Eureka Con. claims to have been damaged \$2,000,000 by the working of the Potts chamber. A suit to recover this sum is still pending in the U. S. Circuit Court at Carson. It was not prosecuted for the reason that the main case had been appealed to the U. S. Supreme Court. A suit for damages would not be just the thing until the Eureka had established its right beyond all question to the controverted premises. The late decision removes the question entirely beyond doubt, and it is now in order to proceed with the action and recover damages. The Eureka *Sentinel* says that both companies express a willingness to settle at a fair figure. The Richmond is entitled in equity to a credit equal to the cost of mining, transportation and smelting. This would reduce the damage to the net yield of the ore. The companies were a mile apart when they began to talk figures. But the question has not yet been dropped. A sort of high joint commission is to wrestle with the matter in San Francisco.

The Zacaten mill, Skull flat, near West Point, Calaveras county, was burned last week. Loss, about \$8,000. The fire was supposed to be the work of an incendiary.

### Alaska Mines.

It seems that affairs at the Alaska mines are not as smooth as might be. The placer mines do not seem to amount to much and the quartz is not so rich as was represented. The following items of news were telegraphed from Port Townsend, W. T., when the *California* arrived there from Sitka, Alaska:

In view of the raised influx of miners at Rockwell, Alaska, and the liability of disputes concerning property which might lead to personal collision among citizens, resulting in loss of life, in the absence of civil laws in the Territory, Commander Glass, in command of the naval forces in Alaska, and senior United States officer, has announced officially that in case of necessity, he will use the force under his command to preserve peace, if controversy shall arise involving the right to property which cannot be amicably settled and personal violence is threatened. Commander Glass will hold possession of the property in the name of the United States until its rightful ownership is settled by the proper Federal authorities. He closes his official notice by stating that the operation of any mining regulations not in conflict with United States laws, will in no way be interfered with, and his order is not in any way intended to affect the rights to any property now held or that may be acquired in accordance with such laws. He declares that military authority will be the only recognized government until contrary instructions are received from the President of the United States. Lieut. Rockwell, with a force of 21 mariners and seamen and four officers, are now in quarters at Harrisburg with instructions

### Manganese Ores.

The commercially valuable ores of manganese are the oxides, of which there are six known, the commonest and best known form being black oxide of manganese, which is really the sesquioxide, or the mineral pyrolusite, powdered up. Manganese compounds have valuable uses in dyeing and in medicine. Metallic manganese has not come into use as a metal or as an alloy, though it forms alloys with very promising qualities. The reason for this is the cost of procuring it from the ores.

Pyrolusite is found on Red Rock, in San Francisco bay, just opposite San Quentin, and on the route to the rivers at the head of the bay. It is also found at Brandon, Vermont; at Conway, Mass.; Winchester, N. H.; Salesbury and Kent, Conn. It is also found in Nova Scotia, Moravia, Thuringia, Bohemia, and elsewhere. Mangasite, which is another important form of manganese, we do not find in this State.

The ores which are found as oxides are from a reddish brown to black, varying from earthy to a dull resinous appearance, lacking metallic luster, bruising and streaking either the same or a lighter color. To the eye it more or less resembles some flinty compounds, tin ore, the friable garnet and spinel, some iron ores and certain magaesian rocks. J. S. Phillips, in his "Explorers', Miners' and Metallurgists' Companion," says that manganese is readily distinguished from the flint, tin stone, garnet and spinel by its inferior hardness (not scratching glass), and from all minerals, by affording a surprisingly delicate characteristic greenish hue, when fused with carbonates of soda, either on platinum foil over a spirit lamp, or platinum

### Cleavage of Minerals.

Webster defines "cleavage," with reference to crystallography, as "the quality of splitting or dividing naturally; direction of dividing planes." This definition, with reference to geology, is "division into laminae like slate, with the lamination not parallel to the planes of deposition. Miners in examining minerals often notice that they break in regular lines, but they may not know that there are various forms of cleavage. All or most crystallized minerals have certain directions in which their cohesive power is weakest—ones in which they consequently yield most readily to an exterior force. This tendency to break in the direction of certain planes is what is called cleavage, and it is one of the characteristics of certain minerals. Cleavage differs according to the ease with which it is obtained and according to its direction, crystallographically determined.

Dana says, 1st: Cleavage is called *perfect* or *imperfect* when it is obtained with great ease, affording smooth, lustrous surfaces, as in mica, topaz and calcite. Inferior degrees of cleavage are spoken of as distinct, indistinct, or imperfect, interrupted, in traces, difficult. These terms are sufficiently intelligible without further explanation. It may be noticed that the cleavage of a species is sometimes better developed in some of its varieties than in others.

2d. Cleavage is also named according to the direction, crystallographically defined, which it takes in a species. When parallel to the basal section, it is called basal, as in topaz; parallel to the prism, as in amphibole, it is called prismatic; also macrodiagonal, orthodiagonal, etc., when parallel to the several diagonal sections; parallel to the faces of the cube, octahedron, dodecahedron, or rhombohedron, it is called cubic, as galenite; octahedral, as fluorite; dodecahedral, as sphalerite; rhombohedral, as calcite.

Intimately connected with the cleavage of crystallized minerals are the divisional planes investigated by Reuch. He has found that by pressure, or by a sudden blow, divisional planes are in many cases produced, which are analogous to the cleavage planes. The first he calls *Gleitflächen*, or planes on which a sliding of the molecules upon each other takes place. Thus, for example, if two opposite dodecahedral edges of a cubic cleavage mass of rock salt, all regularly filed away, and the mass then subjected to a pressure in this direction, a *Gleitfläche* is obtained, parallel to the dodecahedral face. The figures on each hand, obtained by a blow on a rounded steel point, placed perpendicularly to the natural or cleavage face of a crystal, are called by him fracture figures (*Schlagfiguren*). The divisional planes in this case appear as cracks diverging from the point where the blow has been made.

In regard to cleavage two principles may be stated. 1st. "In any species, the direction in which the cleavage takes place is always parallel to some plane, which either actually occurs in the crystals or may exist there in accordance with general laws." 2d. Cleavage is uniform as to ease, parallel to all like planes.

### Low-Grade Ores.

The problem, "can low-grade ores be made to pay," is the most important one of any to our mining population. Inasmuch as nearly every camp has more or less of an abundance of low-grade ores, while there are few, comparatively, high-grade ore mines, the method of working low-grade is much more important than the other. In California, we are rapidly solving this question with respect to the gold ores, as will be seen from the following extract from the semi-annual report of the English company owning and working the Sierra Buttes and Plumas Eureka, in Sierra and Plumas counties.

During the last half of 1880 the Sierra Buttes mine yielded 24,864 tons at an average cost of \$3.56 per ton, the mill crushing 25,091 tons at an average cost of 63 cents per ton, making the total cost \$4.19, as compared with \$3.97 in the first half of the year. Despite this slight increase in the cost of manipulation the rock, the aggregated expenses were only \$88,478, against \$101,539. The yield of free gold was \$5.91, and including tailings, \$6.34, an increase of about \$1 per ton. The net credit balance was \$18,024 13s 10d, from which a dividend of 10 per share, or \$6.125, was declared, leaving a balance of \$11,899 13s 10d to be carried forward. The product of the Plumas Eureka mine for the same time was 24,960 tons, and by the Seventy-six mine 12,490 tons, at an average cost of \$2.66 per ton. The quantity crushed by the two mills was 38,571 tons at an average cost of 56 cents per ton, making the total cost \$3.22 per ton. It is this economical working of mines that is attended with such success. The average value of the ore crushed was \$6.50 per ton, the aggregate amount being \$250,482. The profit for the half year was \$21,422 5s 9d from which a dividend of 3s per share, or \$21,093 15s was declared, leaving a balance of \$12,886 11s 3d to be carried forward.

Ore shipments to Salt Lake are being made by the Wood River mines.



THE BUCKLAND BUGGY.

to make no interference, save in the prevention of violence or bloodshed.

Miners and experts say that Harrisburg is the most peaceable camp they have ever seen.

There is yet much snow at the mines, though a good number of the ledges are exposed, and are opening up finely. The mines are good and the ore of a high grade, but not as rich as at first represented. A number of experts and capitalists have been driven off by the exorbitant prices put upon the mines, and the unsettled condition of rightful ownership. Two or three sales have taken place. New discoveries have been made in the same district some eight miles distant. They are not reported on very favorably. The placer claims are not considered of much value, and little or no prospecting has been done upon them. Mining business is already very much complicated, and in the absence of any civil law valuable property may lie idle for a long time. There have been several disputes regarding town lots, but they have all been peaceably settled.

**MINING TROUBLE IN SAN BERNARDINO.**—An associated press dispatch of the 22d says: United States Deputy Collector E. F. Bean seized the Ivanpah Consolidated mill and mining company's mill and other property, under a United States warrant for distraint, on the night of the 17th, at Ivanpah. The seizure was resisted by John McFarlane, J. B. Cook, and others, and an attempt was made by McFarlane and Cook to kill Bean, and also Mr. Hison, who had been deputized and placed in charge of the mine by Collector Bean. J. B. Cook drew a revolver on Hison, and was in the act of discharging it, when Bean seized the revolver with one hand and struck Cook with the other, and then clinched, and a desperate encounter took place between them, during which John McFarlane rushed in with a shotgun and attempted to shoot Bean. Fred. Hison then stepped in, when John McFarlane turned upon Hison and discharged his gun. Hison threw the gun up and the charge passed near his head and lodged in the woodwork of the mill. Then they clinched, and McFarlane, using a knife, inflicted a severe wound in Hison's head, after which Hison drew and discharged his revolver under his arm three times, two shots taking effect and killing McFarlane instantly. Bean and Hison left the mill, and two shots were fired at them by parties concealed in the mill. Mr. Bean succeeded in keeping possession.

or iron wire loop before the oxidizing flame; or in an iron spoon over a clear, open fire. This is by far the best reaction, which may, however, be further corroborated by fusing it with borax in the same manner; when the hot glass will shine from violet to amethyst, and the cold glass reddish violet, approaching to purple, which appears almost black when in excessive quantity.

An addition of a very small crystal of niter increases the color, by more complete oxidation, where minute quantities are present; and pulverization of the bead exposes the thus modified and true color of the glass, when in excess, much easier and better than flattening with the forceps, so often recommended. By completely enclosing the borax bead in the yellow flame this color may be destroyed by reduction of the metal. As nickel gives a too similar bead with borax, this infallible carbonate of soda test is also necessary for absolute certainty. Manganese when hoiled with sulphuric acid may be detected by adding litharge, which changes the solution to pink.

**THE Tombstone Epitaph** gives a detailed account of two most important strikes in the Empire mine on the 400 level. A well-defined vein, six ft. wide, has been cut, from which the assays average \$25.78. This is the only mine on the Arizona belt which has not heretofore proven a producer. It is a Boston incorporation. In the northwest workings of the Good Enough mine, near the Arizona line, a four-ft. vein of ore has been struck, assaying as high as \$4,000. This is in new ground and a most important strike.

In the case of Joseph A. Donobue against the Mariposa land and mining company, of California, and the Farmers' loan and trust company, Judge Evans has appointed Sylvester Hemenway receiver, in the place of R. E. Meyer, removed, at a salary of \$250 a month, with bonds in the sum of \$50,000. Immediately after delivering up possession, R. E. Meyer, the old receiver, has been directed to file his accounts, to enable the Court to make a settlement thereof.

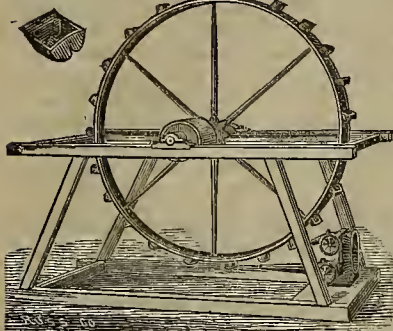
N. E. NELL, who went down to San Jose, Lower California, to take charge of some newly discovered copper mines, was drowned on the 3d inst. on landing freight with a boat.

The Bullionville Smelting Co. are sending plenty of bullion to the Salt Lake market.



## THE PELTON WATER WHEEL.

(Patented, Oct. 26, 1880.)

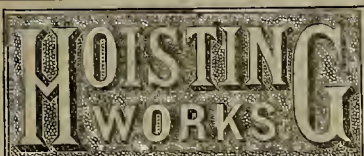


This water wheel has been thoroughly tested with the Dynamometer, and utilizes 78% of the theoretical power; and underheads of water of 75 to 800 ft. is guaranteed to give better satisfaction than any Turbine or other wheel ever offered to the public. The above per cent. is due to the peculiar shape of the buckets used. They do not reduce the water to a spray, but divide and deflect it outward and backward, in such a manner that a part of the impact and the whole reactionary force are utilized, without any part of the water coming in contact with the bucket following. Furthermore, the per cent. of efficiency remains constant through great variations in the amount of water used. These buckets can be taken off in transportation, and can be replaced by new ones when worn out by sand in the water; also can be applied to wooden wheels when desired.

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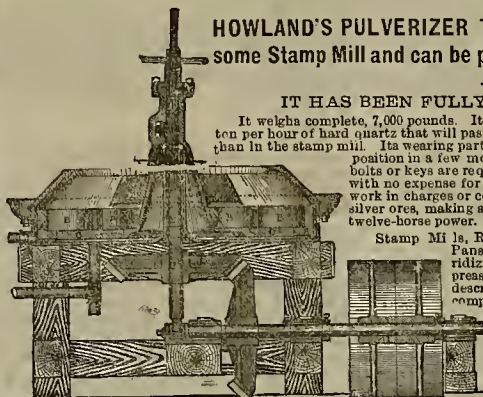
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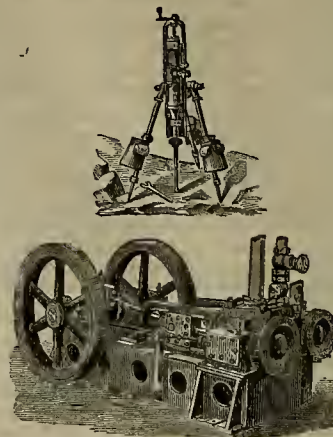
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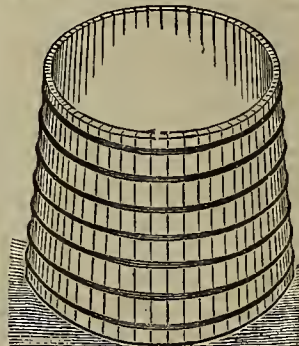
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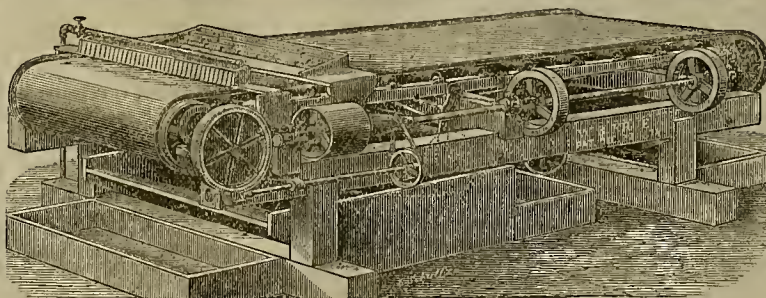
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.]

FOR THE WEEK ENDING MAY 10, 1881.

241,270.—ROLLER SEATE—W. Atin, S. F.  
241,234.—VEHICLE WHEEL—J. H. Bradshaw, San Leandro, Cal.  
241,299.—SWITCH FOR CABLE-WAYS—H. Casebolt, S. F.  
241,427.—FAUCET—W. M. Sack, Oakland, Cal.  
241,466.—FIRE ARM—J. W. Wilson, S. F.

FOR THE WEEK ENDING MAY 17, 1881.

241,430.—FURNACE—J. Enright, San Jose, Cal.  
241,485.—DOOR WICKET—L. P. Garcia & A. W. Baldwin, S. F.  
241,749.—STAMP PROTECTOR—J. L. Lillenthal, S. F.  
241,749.—DRAG SAW—J. W. Swales, S. F.  
24,463.—LASEL—H. Vandre & Co., Oakland, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through DEWEY & CO.'S SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**STAMP PROTECTOR.**—J. Leo Lillenthal, S. F. Dated May 17, 1881. No. 241,678. This invention is designed as a means for protecting Internal Revenue stamps, employed and need by the Internal Revenue Department for distillers and liquor-dealers, by pasting upon pipes and barrels, or other packages, so the said stamps will not become injured or destroyed during transportation or storage, and in combining with the same a shipping card or ticket. That class of Internal Revenue liquor stamps which this device is especially intended to protect have the stamp number printed upon that portion of the stamp which extends across the center, and when the stamp is pasted upon the package the end portions are pasted down firmly. While this center, which is technically known as the "double back" or "pull back," is left free, so that when the contents of any package are to be withdrawn, that portion of the stamp number may be removed and deposited with the revenue authorities. The device will protect and cover all stamps on packages which are necessary for identification and protection. Its use and employment is a necessity in the shipment of stamped packages from one portion of the country to another, as the stamps become mutilated by rough usage or by rats. The invention provides a protector or mark for the central portion of the stamp and stamp number; and in combination with it, provides a shipping mark or ticket, which may be formed as a part of the protector.

### Our Agents.

Our traveling correspondent, A. Leonard Meyer, now at Hailey, on Wood river, Alturas county, Idaho, had his hand severely hurt by a runaway horse while in Utah, and was laid up for several weeks from the effects of the accident. He is, however, getting on very well now, and shall soon have entirely recovered.

And this reminds us that newspaper agents and correspondents who travel on this coast, do not have a very easy time of it, and their services are perhaps not as much appreciated as they should be. Our agents have to rough it in every kind of way. They have to take all kinds of fare; travel at all sorts of hours; have extremes of heat and cold in one day; arrive strangers in strange towns with no one to welcome them.

These men do a good deal of good to the country. They hunt up all sorts of information about it which a resident would not notice. They bring into public prominence enterprises and plans which would otherwise remain obscure for years. They assist in the development of the country; call the attention of capital to suitable forms of investment; describe the routes of travel, railroads, stage lines, roads, etc. They visit the mountains and the villages; go into the mines and mills; and by their judicious descriptions attract the notice of outside people to the towns. No place that these men visit can fail to be benefited to a greater or less degree.

It is not often, by the way, that a good word is said for the traveling newspaper agent and solicitor. Yet he has many good qualities. He is a shrewd judge of character; and while apt, perhaps, to get rather a superficial view of affairs in his hurry, is pretty certain to get a correct one. If people would but think a moment they would feel that these agents deserve encouragement in every possible way.

AFTER the denial of the motion of defendants for a change of venue in the suit of the city of Marysville vs. North Bloomfield Gravel M. Co., the plaintiff, by leave of the Court, filed an amendment to the original complaint to confine the pleadings to the opinion of the late Supreme Court in the case of Keyes vs. Little York Gold Washing and Water Co. The defendants were granted the statutory 10 days in which to plead an amended complaint.

### "Copp's U. S. Mineral Lands."

The new work\* with this above title has just been issued by Henry N. Copp, and contains 570 pages. It comprises laws, forms, instructions and decisions, rules of practice, etc., etc. The work is a very complete one in every respect, and everybody connected with the mining interests in any way will do well to purchase it. Probably no better idea of the scope of the work can be given than by quoting part of the table of contents:

**PART I—LAWS.** United States Revised Mining Statutes, with extracts from the laws of 1866, 1870, and 1872, following appropriate sections; Laws of 1866 and 1870 in full, for reference; A table of parallel reference of Laws and Revises; Statutes, Acts of Congress in full of February 18, 1873, March 1, 1873, June 6, 1874, February 11, 1875, May 5, 1876, January 22, 1880; Sundry Tunnel Law; Timber-cutting Law; Timber and Stone Law; Saline Law, and Coal Laws of 1864, 1865, and 1873.

**PART II—LAND OFFICE REGULATIONS.** (a) General Circular of instructions; (b) Circular of July 15, 1873, defining valuable deposits and rock in place; (c) Circulars relative to hearings; (d) Circulars relative to surveys; (e) Circulars relative to annual expenditures; (f) Stone and Timber lands; (g) Saline lands and salt deposits; (h) Coal land regulations.

**PART III—LAND OFFICE RULINGS.** (a) All the important rulings under the general laws, chronologically arranged (some 300 pages.) All the decisions under the law of 1866 are brought together, and, as the majority of decisions embrace two or more subjects, no other arrangement can prove satisfactory. A good index will refer the inquirer to all rulings upon a given question. (b) Saline lands and salt deposits (four pages); (c) Coal lands (ten pages.) In preparing these rulings, surplus verbiage has been omitted.

**PART IV—JUDICIAL DECISIONS.** (a) The leading Federal and State decisions in full; (b) Digest of about 200 court decisions.

**PART V—MISCELLANEOUS.** (a) Some thirty-five Forms. Those relating to applications for patent have been revised by C. W. Holcomb, Chief Clerk of the General Land Office, and, until recently, chief of the mining division of that office; (b) Glossary, prepared by Dr. R. W. Raymond, late U. S. mining commissioner. This glossary of mining terms prepared by Dr. Raymond is very complete. He took as a basis the glossary which appeared in Gregory Yale's "Mining Claims and Water Rights in California," and which was prepared by the editor of this journal, Mr. Yale's son. Dr. Raymond has eliminated many Spanish terms and added other terms which have come into vogue since the publication of the original glossary, and has extended its scope.

(c) New Rules of Practice, approved by Secretary Schurz, to take effect February 1, 1881; (d) Full instructions how to examine a mining title. This valuable feature will be appreciated by lawyers, especially those who have lately located in mining communities; (e) The Public Land Commission's Codification relating to mineral lands. It contains numerous references to Court and Land Department decisions under each section.

\*Can be examined or ordered at Dewey & Co.'s Book Department. Price full law binding, \$4.50; half law binding, \$3.

### Tubbs' Hotel.

This hotel has recently changed hands, and has been thoroughly renovated, having been repainted, frescoed and refurnished throughout. Mr. H. S. Greeley, the present proprietor (also of the Galindo hotel, of Oakland), is well known for his thorough knowledge of hotel keeping and for his courtesy and attention to his guests, and is meeting with deserved success at both his hotels.

Tubbs' hotel is within 50 minutes journey from San Francisco. Trains leave Clinton station both to and from every hour, and the street cars to Oakland pass the hotel every half hour. The views of the surrounding country are very beautiful, especially that across Lake Merritt to the hills beyond. We should not omit to mention the stairway fire escape from the upper floor, which preclude all danger to residents from fire.

There is a fine billiard-room, with new tables; good reading-room and sitting-rooms a very elegant ladies' drawing-room, with fine piano; a first-class table is kept; in short, every comfort of a home is to be found here, combined with the freedom of hotel life. The charges are very moderate, and we recommend alike visitors and city residents not to fail to visit this delightful resort. An illustration of the hotel appears from time to time in our columns.

ACCORDING to the Wood River papers, things are booming for prospectors in that country. They swear it is the biggest country on the Lord's footstool.

THE shipments of bullion from Butte, Montana, now average over \$50,000 per week. This will be doubled before fall. The camp is growing rapidly.

THE *Calistogan* says: A third interest in the Rough and Ready mining claim has been sold to certain parties in town; consideration, \$500.

### Bad Timbering in Mines.

The telegraph has brought us news of a disastrous cave at the Golden Terra mine, Terraville, in the Black Hills. The night shift, of 60 men, were just coming on, but only about 20 had entered the tunnel, when a large body of earth fell in at a distance of nearly 200 feet from the mouth, tearing and throwing the timbers at a fearful rate, as far as 100 or 200 feet. One man, Thomas Green, was thrown by the compression of the air nearly 80 feet out of the tunnel against a side wall of an open cut and killed instantly. Two others were blown right through the tunnel. One escaped unhurt, the other was struck by a timber and died. Eleven were buried under the debris. The cave is supposed to be about 250 feet long, 100 feet wide and 80 feet deep, and occurred directly over the large ore chamber, completely filling it. Hundreds of miners were at once sent to the works from Lead and Central Cities, and shifts were changed every 15 minutes, only five or six being able to work on either side of the cave at a time. The tunnel runs entirely through the hill, connecting the Terra and Highland mines. Seven men escaped, with nothing more serious than a few bruises, through the tunnel to the Lead City side of the hill. The nine men who had been imprisoned in the mine were all rescued the next afternoon at 2 o'clock. None of them sustained any injuries. This leaves only three, Thos. Green, Jas. Farley and James Beakey, killed, and five slightly injured. Subscriptions for the relief of those made homeless and destitute have been called for by the press of this Hills, and the people have responded liberally.

It is said no blame can attach to the company or anyone else. We don't believe it. When such a case as this occurs it must be somebody's fault. It is very probable that bad timbering was the cause. It is all very well to be economical, but economy in this respect in a mine is a foolish measure. If we remember aright we have been told that the timbering in this mine was very light, and the accident which has now happened had been predicted. Other mines in the same neighborhood are no better protected. If this accident was due to bad or careless timbering, we believe that heavy damages could be obtained from the company.

### Our Native Woods.

Col. Armstrong of the Santa Rosa Republic writes the following interesting paragraph concerning California forests and lumbering:

There are many valuable timber trees in the Coast range for building and decorating. Beginning with the redwood, it is well known as the very best and cheapest timber for building. The price of redwood boards in this city varies, according to quality and finish, from about \$15 to \$30 per 1,000 ft. Planks and squared timber may be ordered at the mill any desired size, only limited by the capacity of the machinery to saw it. Logs eight ft. in diameter may be sawn into planks; but nobody wants boards eight ft. wide, so the logs over five ft. are generally split into halves or quarters before sending to the mill. This lumber splits true, and works soft and smooth. It is a beautiful cedar color, and very durable. Our redwood forests are probably of more value to the State than all the mines it contains. They are certainly of great use in supplying the everyday wants of improvement, and are a larger factor in the prosperity of our people than the mines are, or ever were, so far as this coast region is concerned.

A vast amount of this valuable timber is annually destroyed by the lumbermen in careless felling, and by fire. Judging by what we have seen in past years, not more than two-thirds of the tall straight trees are safely handled, or cut up clean. True there are shingle mills now working up refuse cuts, and there is springing up a demand for cord wood that pays something for hauling it a mile or two to the railroad. But perhaps nine-tenths of the spoiled trees and waste timber are too remote for such hauling and become food for fire.

Fir is plenty in the same district. It does not possess the durable qualities of redwood for posts, pickets, etc.; but it is hard, strong timber, much used for framing, bridge-building, and, in heavy planks, for sidewalks. It does not grow as large as the redwood, being usually from 100 to 150 ft. in height, and not more than 5 or 6 ft. across the stump. This lumber, in its various rough forms, sells for about \$22 per 1,000 ft. in this city.

Tan bark oak is still very plentiful, though the high price of tan bark is causing the rapid destruction of the timber. Plenty of quarter sections of Government land have been paid for by pre-emptors with the bark found on the land. The wood is the best of fuel. Its grain is variegated and beautiful when worked into chairs, balustrades for stairs, etc. It would be highly appreciated, if better known, for decorative purposes. Plenty of the tree trunks are large and straight enough to saw into flooring and other stuff.

Laurel, or pepper-wood, grows a majestic tree and is found scattered among the hills. The oldest, gnarled trees are the ones producing the best veneers for cabinet work. Straighter trees are in some request for ship building.

Beside the timber mentioned, there are white

and black oak, madrone, etc., staple woods for fuel.

No country is better supplied with useful and ornamental woods than northern California. Building materials are cheaper at Santa Rosa than anywhere in the Atlantic States, remote from the pines. Timber for railroad construction, ties, telegraph poles, and lumber for bridges and depot buildings may also be snatched under the same head.

### News in Brief.

SMALL-POX is spreading in Virginia, Nevada. The Russo-Chinese treaty has been ratified at Peking.

GRASSHOPPERS are doing mischief in Southern Utah.

COL. THOS. A. SCOTT, the great railroad manager, died on the 21st inst.

GROUND broken at Deadwood, D. T., on the Black Hills and Custer City railroad.

It is estimated that 250,000 volumes of the English Testament have been given out.

GRASSHOPPERS are creating much alarm among the farmers of portions of Washington Territory.

THERE are on the railroad lines of California 32,000 carloads or 320,000 tons of wheat, old crop.

SINCE March 30, 1880, there has been 8,113 miles of railroad constructed in the United States.

A CHICAGO dispatch says: The Chinese have formed a Free Mason organization and protective union.

MAYOR KALLOCH, of this city, has been granted six weeks' leave of absence, and has gone East.

THE Nevada and Oregon railroad reports that 100 men, including 30 Chinamen, are at work grading near Reno.

MRS. WM. CHAPMAN died suddenly of heart disease at her home in Josephine county, Oregon, on the 20th inst.

THE Brazilian line of steamers known as the American line has been withdrawn, because foreign rivalry has proven too great.

THE steamship *Ganos*, from Matanzas for Boston, was sunk in a collision near the latter place Friday night. But one life was lost.

RUMOR has it that the contemplated Guatemala Exhibition of 1882 has fallen through, in consequence of the condition of the revenue of the country.

THE steamer *State of California*, over whose non-arrival so much anxiety prevailed, reached San Francisco in tow of a tug. She had broken her main shaft.

THE newspapers published in Eastern Montana claim that more cattle have been killed at the hands of Indians than perished by the cold during the past winter.

JURGENSEN, editor of a socialist paper, the *Herald*, in Copenhagen, has been arrested, charged with inciting to the murder of the king and to establish a commune.

THE new Hungarian loan of £16,000,000 4% gold rentes, has been subscribed many times over, and closes at 3% premium.

SEVERAL well-known Scotch farmers are about to start on a tour through America, with a view of obtaining information in regard to the prospects of agricultural emigrants.

THE unparalleled telegraphic feat of sending 109,436 words from New York to Chicago was accomplished by the Western Union company on Friday night in less than seven hours.

THE Presidents of the various mercantile associations of Boston have called a meeting for the purpose of considering the possibility of inaugurating a world's fair in that city in 1883.

THE Trustees of the Napa Insane Asylum have purchased 402 acres of land from W. H. Coombs for the sum of \$12,000. This makes the Asylum property include about 600 acres.

SOME small pebbles have been found in the vicinity of Eureka, Nevada, which look like diamonds in the rough, and have been so pronounced by local experts. They are to be tested.

THIRTY Red river carts, accompanied by their half-breed drivers from the Judith basin, lately came to Helena, Montana, with 600 buffalo robes, besides skins and furs, dried meat and pemmican.

CAPT. LAFAYETTE ALLEN, a veteran of the Mexican war, and a pioneer of southern Oregon who fought in the early Indian wars, died at his home on the lower Applegate creek, Jackson county, last week.

AT the annual meeting of the stockholders of the Atlantic and Pacific Railroad Co., held on the 19th, at Boston, Charles Nickerson was re-elected President and E. F. Winslow, Vice-President. Both officers held over.

AN investigation of the U. S. Treasury Department is now in order. It is charged that the custodian has been purchasing furniture, carpets, etc., at exorbitant prices, and buying things at private sale instead of by contract.

THE wages offered for first-class seamen to brave the rigors of an Arctic climate on the next expedition in search of the *Jeannette* were so low that it was found impossible to obtain the men in this city, so they will have to be obtained East.



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Scientific Press



Patent Agency.

[ESTABLISHED 1860.]

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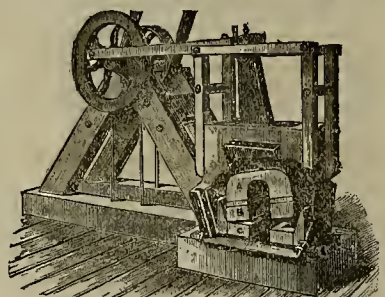
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The undersigned are in receipt of regular supplies from Cardiff, Wales, and offer the COKE for sale in quantities to suit purchasers.

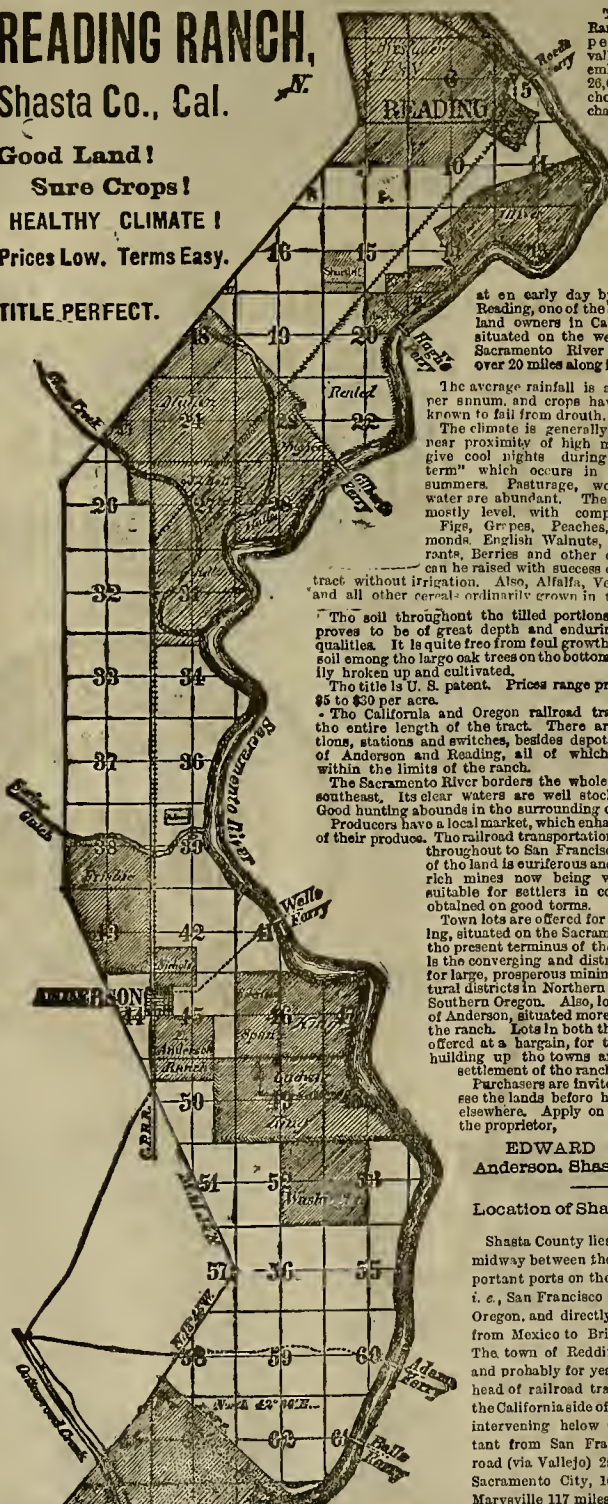
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The average rainfall is about 50 inches per annum, and crops have never been known to fail from drouth.

The climate is generally healthy. The near proximity of high mountain peaks give cool nights during the "heated term" which occurs in our California summers. Pasturage, wood and good water are abundant. The tillage land is mostly level, with complete drainage.

Figs, Grapes, Peaches, Prunes, Almonds, English Walnuts, Apples, Currants, Berries and other common fruits can be raised with success on most of the tract without irrigation. Also, Alfalfa, Vegetables, Corn and all other cereals ordinarily grown in the State.

The soil throughout the tilled portions of the ranch proves to be of great depth and enduring in its good qualities. It is quite free from foul growths. The virgin soil among the large oak trees on the bottom land is easily broken up and cultivated.

The title is U. S. patent. Prices range principally from \$5 to \$30 per acre.

The California and Oregon railroad traverses nearly the entire length of the tract. There are several sections, stations and switches, besides depots at the towns of Anderson and Reading, all of which are located within the limits of the ranch.

The Sacramento River borders the whole tract on the southeast. Its clear waters are well stocked with fish. Good hunting abounds in the surrounding country.

Producers have a local market, which enhances the value of their produce. The railroad transportation route is level throughout to San Francisco. A portion of the land is auriferous and located near rich mines now being worked. Land suitable for settlers in colonies can be obtained on good terms.

Town lots are offered for sale in Reading, situated on the Sacramento river, at the present terminus of the railroad. It is the converging and distributing point for large, prosperous mining and agricultural districts in Northern California and Southern Oregon. Also lots in the town of Anderson, situated more centrally on the ranch. Lots in both these towns are offered at a bargain, for the purpose of building up the towns and facilitating settlement of the ranch.

Purchasers are invited to come and see the lands before buying here or elsewhere. Apply on the ranch, to the proprietor.

**EDWARD FRISBIE,**

Anderson, Shasta Co., Cal.

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Shasta County lies not far from midway between the two most important ports on the Pacific shore, i. e., San Francisco and Portland, Oregon, and directly on the route from Mexico to British Columbia. The town of Redding, at present, and probably for years to come, the head of railroad transportation on the California side of the mountains intervening below Oregon, is distant from San Francisco by railroad (via Vallejo) 255 miles; from Sacramento City, 160 miles; from Marysville 117 miles.

LAND FOR SALE OR RENT IN SUB-DIVISIONS.

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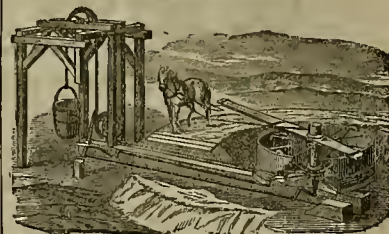
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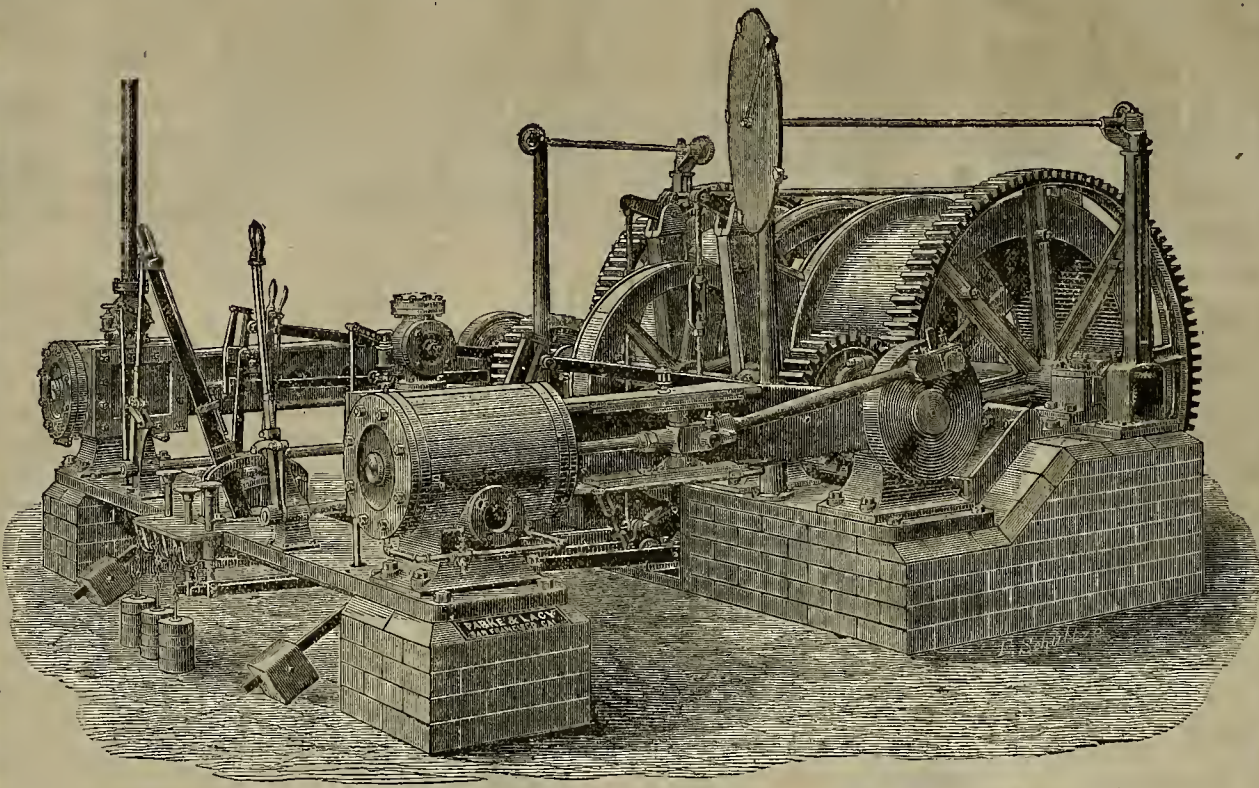


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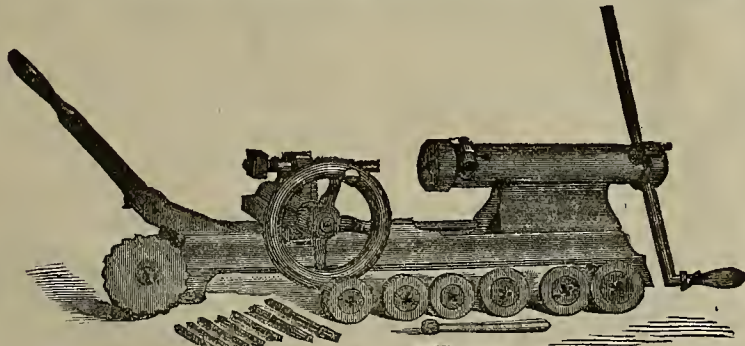
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**WITH TAPS, DIES AND COLLETS COMPLETE.**

B, Stock 23 inches long, 7 Taps and Dies Cuts  $\frac{1}{4}$  to  $\frac{3}{8}$  inch.  
C, " 26 " " 7 " " "  $\frac{3}{8}$  to 1 "  
D, " 53 " " 6 " " "  $\frac{3}{8}$  to  $1\frac{1}{2}$  "

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Made to be bolted to the Bench or Table. Fitted with seven sizes, from  $\frac{1}{4}$  to  $\frac{3}{8}$  inch.  
Usual assortment,  $\frac{1}{4}$ , 5-16,  $\frac{3}{8}$ , 7-16,  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$  inch.

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## EMERY WHEELS and GRINDING MACHINES.

STROUDSBURG, MONROE COUNTY, PA.



## The Tanite Company.

Orders may be addressed to us at any of the fol-  
lowing places at each of which we carry a stock.  
**SAN FRANCISCO, CAL.**  
Nos. 2 and 4 California Street.  
**PORTLAND, OREGON,**  
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**CHICAGO, ILLINOIS.**  
Nos. 152 and 154 Lako Street.  
**ST. LOUIS, MISSOURI,**  
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Room with steam power to let in the  
Pacific Power Co.'s new brick building,  
Stevenson street, near Market. Eleva-  
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 4, 1881.

VOLUME XLII  
Number 23.

## Quicksilver Feeder for Gold Mills.

When automatic ore feeders first came into use, no one believed in them. Everybody thought that it would be necessary to have a man with a shovel standing around to help the feeder; that machinery could not do the work as well as a man. It has been found by experience that automatic feeding is the best; that the machine not only does its work as well, but better than, the man, and now all mills use automatic ore feeders because more ore can be put through in a given time with the same power than under the old system.

People nowadays want to make machinery on pretty much everything, and they succeed very well. The latest thing in automatic mechanism for quartz mills is a quicksilver feeder, the invention of Mr. P. C. DuBois, of No. 18 Fremont St., in this city. We illustrate this device on this page.

This machine is for feeding quicksilver to the mortars of gold mills. It is so connected to the cam shaft, that each revolution of the large ratchet wheel, which can be regulated to revolve once in one, two, three or four minutes, as desired, dips a small cup into a reservoir of quicksilver, and, by a trip of the cam, empties the contents into a pipe leading down to the mortar, supplying an exact quantity at regular intervals, superseding the ordinary hand feeding, which is of necessity subject to great irregularity, and liable to neglect. It renders the amalgamation of all the gold in the pulp equally certain and perfect.

The mechanism to produce this depression and elevation of the cup, is driven by the cam shaft, similarly to the self-feeders, over which so much ingenuity has been expended to regulate the delivery of ore to the mortars. As it is to be desired to have the ore go in constantly and regularly, so it is equally desirable to have the mercury fed constantly and regularly.

Every mill man knows the great importance of ascertaining just the right quantity of mercury necessary to be fed to amalgamate all the gold; and when ascertained, of keeping just that quantity fed to the mortars per hour or per day. If not enough mercury is fed, the amalgam inside and outside becomes too hard and coated with sulphurets, consequently will not catch mors gold or amalgam. If too much mercury is fed, the inside amalgam softens and breaks down. It granulates, after which it is about impossible to catch it again. Likewise, the outside plates become so soft that the sand rapidly wears, and carries away what amalgam has already caught. Once the necessary quantity is determined, regularity of feed is the thing desired.

A chief point of excellence of this machine is, that it allows the quantity of mercury which would be otherwise fed in mass, in one hour, to be subdivided into a number of small portions, and fed almost continuously; i. e., from every one to four minutes. As the gold goes in, and also out of the mortars continuously, it is necessary, in order to effect the best amalgamation, that the quicksilver should go in continuously.

The second point of excellence is, that it renders the feeding of quicksilver practically perfect, as to regularity. A superintendent can adjust the feed to suit the ore being worked, and feel certain that a regular, uninterrupted feed will be kept up during his absence, which is impossible to attain under the general method of hand feeding. It places the feeding of a quantity of quicksilver proper for taking up all the gold in the ore, under the control and knowledge of the superintendent alone, and that, with but a few moments of his attention each day.

The reservoir of the machine holds 25 lbs. of mercury—a quantity sufficient for some weeks' work. A lid fastening on top of the tank keeps all secure. The cup which throws out the mercury can be replaced by a larger or smaller one, as the ore requires more or less mercury; several sizes of cups go with each machine. The frequency of feed is regulated by turning a nut, which controls the thrust of the bar that drives the ratchet wheel; thus making the ratchet pass either one, two, three, or four teeth space, at every revolution of the cam shaft.

## Low Grade Ores.

The problem of working the low-grade ores of the Comstock being solved, hundreds of mines in other places are to be worked in the same way. But this problem has been studied long and earnestly, more attention, however, having been paid to it within the past two years than for a long time. A communication throwing a great deal of light upon the subject is one written by Mathey, Kustal & Riotts, of New York, to J. Aron, Esq., and which is as follows:

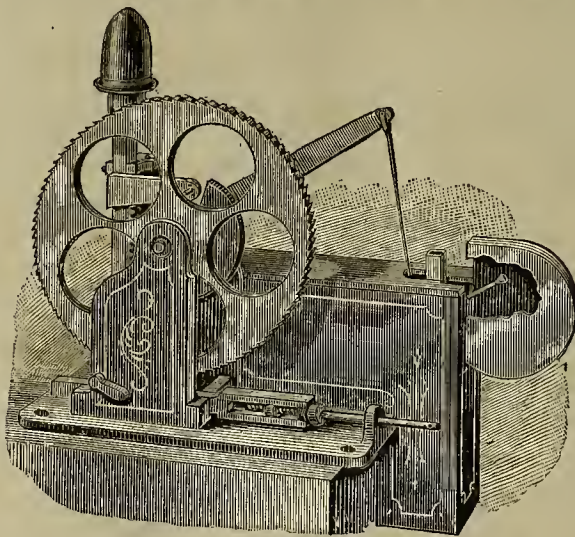
We beg respectfully to submit the following figures: We have concluded not to weigh down this statement of facts by a detailed report of our experiments, futile some, experimental and on false scent others, and repetitions the most. We would merely say that we have made over 100 assays, 35 wet concentration tests, three dry and one combined test.

We received five boxes of ore marked re-

The 47.3 tons of dust can be concentrated down to 1.83 tons of concentrates, containing \$285.22 gold and \$293.61 silver; total, \$578.83. We have then a total yield of concentrates, by the dry process, of 2.9 tons, containing \$670 gold and \$258 silver; by the wet process, 1.83 tons, containing \$285 gold and \$293 silver; total, \$955 gold and \$551 silver, the gold being a percentage of 88% and the silver of 61%, or a grand total of \$1,506 out of a possible \$1,992, equal to 76% of all the precious metals.

We would state that from the best sources of information as to the cost of concentrating wet and dry, we believe that in a 100-ton mill, one ton can be concentrated by either method for \$1, and by the two methods combined for \$1.50. It is further possible that Mr. Krom, to whom we are indebted for the use of his excellent air concentrating machinery, may be able, as he thinks he is, to finish the working of this dust as successfully as was done by us by water.

Considering the astonishing results, we would counsel you to have tests made on a working scale—say that a car-load from five well-devel-



DUBOIS' AUTOMATIC QUICKSILVER FEEDER.

spectively Nos. 1, 2, 3, 4 and 5, which we find to contain, per manifold assay:

	Silver.	Gold.	Total.
No. 1, Savage ore.....	\$13.25	\$3.02	\$16.27
No. 2, Hale & Norcross ore.....	6.28	1.88	8.16
No. 3, 4 and 5, forwarded from the bonanza mines, Con. Virginia and California, under instructions John Mackay.....	0.11	10.81	10.92

Box No. 1 was concentrated so that 100 tons, containing \$1,885 silver and \$302 gold, total \$2,187, gave two tons of concentrates, assaying per ton \$578.24 silver and \$108.06 gold—total \$686.30 per ton, or two tons, \$1,372.60, equal to nearly 63%.

Box No. 2 was concentrated so that 100 tons, containing \$628 silver and \$188 gold, total \$816, gave one ton of concentrates, containing \$422, equal to 52%. [This was the first box treated, being the poorest ore, and we are confident that, with our present experience, we could reach the same percentages as with box No. 1.]

Boxes 3, 4 and 5 were joined and treated as one—first, exclusively by the wet way. Our trials resulted as follows: 100 tons, containing \$911 silver and \$1,081 gold, total \$1,992, yielded 2 7/8-100 tons of concentrates, which contain per ton \$144.55 silver and \$276.38 gold—total \$420.93, or total value of 2 7/8-100 tons of concentrates, \$401.71 silver and \$768.40 gold—total \$1,170.11, or equal to about 58%.

Second.—Dry concentration test made on ore from boxes 3, 4 and 5, mixed. One hundred tons crushed through a No. 4 screen, and worked upon a "Krom" concentrator will yield:

	Tons.	Silver.	Gold.
Dust.....	47.3	containing	\$539.00
Fine Tailings.....	35.3	"	66.00
Coarse.....	14.50	"	42.30
Concentrations.....	2.9	"	268.00

Totals.....100 tons "\$905.30 \$1,086.81  
Showing that 100 tons contained originally \$1,992.11 of gold and silver.

## A Needed Cable Connection.

While Cyrus W. Field was on his recent journey around the world, it became necessary to send a telegraphic dispatch to him from New York, which should reach him at Yokohama. When the San Francisco steamer arrived with him on board, he was handed the dispatch as soon as he went on shore, but by what a roundabout journey it had come. It had been sent from New York to Cape Breton, thence under the Gulf of St. Lawrence to Newfoundland, and across Newfoundland. It had been flashed thence under the Atlantic Ocean to Ireland, across Ireland and under the Irish channel to England, across England to Plymouth, under the Bay of Biscay to Lishon, Portugal, thence to Gibraltar, thence to Malta in the Mediterranean, under the Mediterranean to Alexandria, Egypt, thence across the Isthmus of Suez, by the great pyramids, and under the Red sea to Aden, Arabia, thence under the Indian ocean to Bombay, across Hindoostan to Calcutta, under the Bay of Bengal to Penang, thence through the Straits of Malacca to Singapore, near the equator, thence under the China sea to Hong Kong, along the coast 1,500 miles to Shanghai, by cable under the Yellow sea to Japan, and thence across the beautiful hills of Japan to Yokohama.

Now all this roundabout journey could be saved were there a cable under the Pacific ocean from San Francisco to Yokohama. That cable is really needed to complete the electric circle of the world. Surveys of the bottom of the Pacific ocean have been made by Government expeditions, soundings having been taken on several lines. One line was from San Francisco to Yokohama; another from San Diego to Yokohama; another from Cape Mendocino to Yokohama; still another survey was made from Sitka across the Aleutian archipelago and so to the Japan side.

It is not probable that immediate steps will be taken to put a cable across the Pacific; but at some future time there is little doubt but it will be laid.

## Mining Titles in Alaska.

Mines are being taken up in Alaska under the United States mining laws, the same as they are anywhere in the United States. This title is only possessory, however, and local laws must be strictly obeyed. The Commissioner of the General Land Office, in reply to inquiries as to mineral lands in Alaska, says: "It is held by this office that the mineral lands of the public domain in Alaska are subject to exploration and occupation by citizens of United States and those who have declared their intention to become such. The Territory of Alaska has not been established as, or annexed to any surveying district, and no way has been provided by law whereby lands therein may be purchased. It will, therefore, appear that title to mineral land cannot, under present legislation, be acquired from the United States."

This means of course that, as no surveys have been made, no "corners" established, and no mineral surveys deputized up there, plats cannot be made upon which patents can be taken out. But as people here get along very well without a patent until they want to sell, they will probably get along up in Alaska for awhile as they are. Let them find good mines and it will not be long before means will show themselves by which they can get good title to the mines.

The American Institute of Mining Engineers met at Staunton, Va., this week. Wm. Metcalf, of Pittsburgh, President of the Institute, was first welcomed in the opera house by Mayor Balthus, and then A. H. H. Stuart, Secretary of the Interior under President Filmore. President Metcalf enlarged on the great mineral resources of the Virginia section, which are being entirely neglected in favor of the discovery of minerals in rocky peaks in the West, and in favor of arid plains.

The mine-jumping season opens up briskly in the Black Hills, Dakota.

The Grand Dipper, says the Tomahstone Daily Epitaph, has been handed, by telegraph, to New York parties, for 30 days, the consideration being \$40,000. The party holding is C. M. Bullard, of Tomahstone. Thus one by one, Eastern men are picking up the good mines of the district.



## Copper Smelting—Its History and Processes.—No. 8.

[By HENRY HUSSEY VIVIAN, M. P.]

I must now return to our regular copper smelting process. We have advanced to "white metal," pure (or nearly so) sulphide of copper of, say, 75%—Le Play gives it as high as 77.4%, with 0.7 iron, and 21% sulphur. The next process is what we call "roasting," during which the whole of the sulphur is expelled and the copper reduced to an impure metallic condition known as "blistered copper." Le Play's analysis gives it as 98.4% copper, 0.7% iron; nickel, cobalt, manganese, tin and arsenic, 0.7%; sulphur, 0.2%. It is very remarkable how completely the sulphur has been driven off. This "roasting" process is a very beautiful and delicate operation; and as I am not aware that any thoroughly good account of it exists, I think it will be interesting and instructive if I read a description of it by our Mr. William Morgan, who has for 47 years managed our Hafod Copper Works with the utmost ability and intelligence: Copper Roaster.

"The material operated on in these furnaces consists of white or pimpled metal furnace—regulate from the selecting process, as well as the metallic bottoms from the same process. In the old method of smelting, for ordinary tough copper, no selecting process was adopted, but the metal just as it came from the metal furnace was used, as is now done, both for tough and best selected copper. The pigs of white metal from the metal furnace are broken into large lumps and introduced into the roasting furnace by means of a paddle, and piled up as high as possible in the middle of the furnace. The temperature of the furnace is raised very gradually, so as to produce a very slow fusion, the melted metal falling down in drops, all the while subject to the oxidizing action of two streams of atmospheric air, introduced through two holes (plug-holes) at the back of the furnace, one in either side of the bridge. After the whole has been melted down, the temperature is considerably raised (the air-holes being closed up for this purpose), and the surface of the melted metal freed by 'skimming' from it any slag floating on the face of the charge. The air-holes are then again opened, and as also the head of the fire-place, and the charge cooled down till quite 'set' or hard. During this operation, called 'setting,' the whole charge becomes a spongy mass, and swells to twice or thrice its original thickness when in a melting state. The theory of the roasting process is just this: When sulphide of copper in a melting state is exposed to the action of a current of atmospheric air, decomposition of the sulphide occurs and sulphurous acid gas and oxide of copper are the result. The thin film of oxide of copper produced on the surface is immediately acted on by the sulphide of copper with which it is in contact, and sulphurous acid and metallic copper are the result, the gas passing off through the chimney, the metallic copper from its greater specific gravity falling through the melting mass to the bottom of the furnace, where it is protected from further oxidation. In the production and reduction of the oxide of copper, dense volumes of sulphurous acid escape, and, as the reduction takes place mainly under the surface of the melted metal, the gas resulting from this reduction forces up the cooling metal, until the whole mass assumes the spongy consistency above referred to. When the whole charge has been thoroughly cooled down, so as to become black and hard, the temperature is again raised, but very slowly and gradually as at the first. The object both of the first slow melting and the subsequent remelting of the cooled and raised mass is the production of surface action. In this way, almost every portion is brought under the oxidizing influence of the atmosphere. "Generally speaking, long before the whole of the charge has been remelted, the experienced workman finds, from the large production of oxide of copper, that it is necessary to cut off all further access of atmospheric air, to prevent the whole or a large portion of the charge from becoming oxidized. If the oxidizing process has been conducted first to the right point, it will be found, after the whole of the charge has been melted and the surface freed from slag (which is mainly silicate and aluminate of copper), that the copper when tapped into pigs and cooled has a smooth, blistered appearance, which appearance has given a name to the product of 'blistered' copper. This process occupies 24 hours, and the charge varies from 2½ to 4 tons of copper."

This process is essentially South Welsh, although it is now of world-wide use.

The system of concentration from ore-furnace regulus to black copper varies somewhat in continental works; but it may be generally described as consisting of first burning the regulus repeatedly in heaps or in kilns, and then melting it in a blast furnace, whereby a portion of the copper contents is obtained as black or impure copper of 90% to 95%, with about 3% iron and 1% sulphur, while the remainder of the copper flows out as regulus varying from 51% to 61% copper, 16% to 18% iron, and 20% to 24% sulphur. It will be observed that the blast furnace, owing to its reducing action, produces at one and the same time black copper and regulus never exceeding 61%, while the reverberatory furnace gives one pure product of 75%, which is easily and cheaply reduced into copper of upward of 98%. The superiority of our process over the other is now universally recognized;

and our process has been substituted for the old continental system, I believe, in most works.

The same observation applies to the final process of refining. Here again, I think, I cannot do better than read to you an admirable description of our refining process, written by Mr. William Morgan, who has been a practical refiner all his life, rather than attempt to write one myself.

### Refinery.

"The material dealt with in this refinery furnace is the 'blistered' copper produced in the roaster furnace, and contains from 96% to 98% of copper. The charge occupies 24 hours and weighs from 9 to 10 tons. It is melted during the night, and remains several hours in the furnace in a melted state. The first operation in the process of refining is the skimming off from the surface of the copper the slag which has been produced in the melting of the charge, in order to facilitate the separation of the last portions of sulphur from the copper. To ascertain when the copper is 'fine,' or when it is perfectly free from sulphur, a portion is taken out in a ladle and allowed to cool. If it still contains sulphur, the copper rises in the center of the ladle, or bubbles out over the surface of the set portion, or shows a number of black spots, generally forming a circle according to the quantity of sulphur still left in the metal. When perfectly free from sulphur, there occurs a depression in the center of the copper in cooling, called the 'set.' When it has arrived at this state, the copper exhibits in the fracture a dull red appearance, and is very brittle and unmanageable. In this state, the copper contains a considerable quantity of protoxide of copper, which has been taken up or absorbed by the melting mass as quickly as formed at the surface. In most cases, it reaches the point of saturation by the time the whole of the sulphur has been driven off, to effect which the surface of the copper is left exposed to the action of the air. The next operation is a reducing or deoxidizing one—to convert the oxide of copper, which the copper holds, into the metallic state. The surface of the charge is covered either with stone coal or charcoal; and in order to bring every portion of the mass under the influence of the reducing covering on the surface of the charge, a pole of hard wood is pressed down into the melting mass, and the ebullition caused by the escape of the gases from the burning pole so stirs the whole mass that gradually every portion of the charge is brought into contact with the carbonaceous covering, when the oxide of copper yields up its oxygen to the carbon on the surface, and the whole mass becomes malleable. The changes which take place during the 'poling' process are ascertained by frequently taking small portions of the copper, and examining the fracture, which, when the process is complete, is smooth and silky. If this process of poling be carried too far, the whole mass suddenly becomes 'overpoled,' in which state the color of the copper becomes much whiter in the fracture, and the copper assumes a fibrous, crystalline structure when broken, and when ladled into a mold, on setting it rises in the center, just as silver does when cooling in a test. Whatever may be the cause of the appearance or condition which is thus called 'overpoled,' whether from the copper taking carbon into its composition, or from its being deprived of the whole of its oxygen, the means of remedying the matter is the exposing of the surface of the copper again to the action of the atmospheric air."

### The Continental System

Was to melt the black copper in a shallow 'hearth,' called a Gaarheerd, like a blacksmith's forge, by means of a blast issuing from a sharply inclined tuyere, and impinging on ignited charcoal. Slag forms on the surface of the copper, and is from time to time removed. Tests of the condition of the copper are taken; and when these tests indicate that the copper is fine, the blast is stopped, and either the copper is ladled out and cast into molds or taken off in round, thin masses ('rosette' copper) as the trade may require.

We have now obtained our copper in a fine and marketable state, containing at least 99½% of pure copper. But what have we got?

### Is It Pure Copper?

Is it in a marketable state? I am almost disposed to tell you that no 10 persons in this room differ more from each other than perhaps the quality of 10 succeeding charges of copper made by a copper smelter differ from each other. Mind, I speak critically, not with the enthusiasm of youth, which thinks every face beautiful. I speak of minute differences of quality, generally of no moment, but sometimes of very great moment. I think if I were to ask Mr. Morgan what had been the chief labor of his life, he would reply, "To make good copper." I am sure it has been one of my most constant problems. Now, I have caused a few specimens to be prepared, which will show you upon what minute quantities of what our friend, Joachim Gans, 300 years ago, not inaptly called "corrupt humors," which we should now call "impurities," the quality of copper turns. Let me first say that copper may be of first-rate quality for all copper uses, and yet very inferior when used for making brass; and when I tell you that nearly one-half the copper produced in the world is used for the latter purpose, you will at once appreciate the enormous importance of producing copper of such a quality as to render it available for that manufacture. I well remember when our copper was never tried for brass before it left our works; indeed, I myself introduced the practice even before I took management of them some six-and-thirty years ago.

Many was the cargo of copper we had thrown on our hands by the French brass-makers in those days, and a very unpleasant business it was. We, however, very soon introduced a perfect system of trials for quality which has enabled us to avoid such annoyances. In very early days, I took in hand a series of synthetical trials, which proved of great value. I found chemical analysis slow and most unsatisfactory; traces of this, that, and the other impurity were reported; but who could say to what extent the quality of the copper for one use or another was really affected? It occurred to me that the true way of solving the difficulty would be to take the best copper I could get, and make it bad by various known mixtures of impurities; and I soon found that I was thus enabled to unravel much of the mystery of quality. For the purpose of my lecture to-night, I have caused a few of these synthetical trials to be repeated, and here they are. I do not present them to you as complete or exhaustive, but rather to illustrate this branch of my subject.

(TO BE CONTINUED.)

### Means of Desulphurization of Ores.

The desulphurization of ores is affected: a. By heating with free admission of air. This is the common way of "roasting," and the most important, and is effected either in kilns, heaps, etc., or in reverberatory furnaces. As soon as the sulphureted ore is heated to a certain degree, one part of the sulphur escapes as sulphurous acid; another is converted into sulphuric acid. Some sulphurets (iron pyrites) lose their sulphur without the application of heat, being decomposed by exposure to the action of air for a long time. This way is sometimes practiced on gold-bearing pyrites. b. By heating with exclusion of air. Only the sulphides of gold and platinum are perfectly decomposed by this method. Other sulphureted ores lose their sulphur only in part, being reduced to a lower state of sulphide. Sulphurets of silver (Ag<sub>2</sub>S) remains undecomposed. Cinnabar, sulphide of antimony (Sb<sub>2</sub>S<sub>3</sub>) and sulphide of arsenic volatilize unchanged. Iron pyrites (FeS<sub>2</sub>) gives up 23% of its sulphur, being reduced to magnetic pyrites, and, by a strong heat, to proto-sulphide of iron (FeS), not further reducible. Also sulphide of zinc (zincblende) remains undecomposed. Copper glance retains its sulphur, and copper pyrites loses only one part of the sulphur which is combined with the iron in it. Galena (PbS) is reduced to a lower state (Pb<sub>2</sub>S), a part of the lead separating out in a metallic state (Pb). c. By superheated steam. Sulphurets not evolving sulphur by the last process lose their sulphur slowly on the application of steam, sulphureted hydrogen and sulphurous acid being formed. Experiments made by Regnault showed that desulphurization is effected more perfectly if air is admitted. Roasting in reverberatory furnaces is always effected by the oxygen of the air and by steam, as there is no fuel used which contains less than 25% to 30% of water. Superheated steam has been tried in different ways on sulphurets with the highest expectations, but with no better results for practical use than are given in the ordinary way by the steam obtained from fuel. It may be useful in many instances to have more steam than is true obtained, but this increases considerably the expense of roasting; as, for instance, in Patena's application of steam in roasting silver ores, tried principally with the intention of expelling antimony, arsenic, etc. Another application of superheated steam, with exclusion of air is Hagan's method, which may prove successful on pyritic ores, having at the same time the advantage of being a very cheap method. d. By heating with metals, alkalies or alkaline earths, for which the sulphur has a greater affinity. The affinity of sulphur for the following metals decreases in the order in which they stand, being strongest for the first and weakest for the last: Copper, iron, tin, zinc, lead, silver, antimony, arsenic. Each of these metals can be desulphurized by the next preceding, though with difficulty; but more easily by one further off. Practical use of this property is made in smelting galena with the addition of metallic iron or iron ore. Sulphide of silver in crucibles is decomposed by stirring the liquid with red-hot iron. In a cold way silver sulphurets and chlorides are decomposed by iron in amalgamating pans, the chlorides by iron and quicksilver. Quicksilver is obtained from cinnabar by heating the latter with lime, which takes up the sulphur, etc. e. Carbon has no great affinity for sulphur; the use of charcoal for desulphurization of ores is therefore an inferior method. So is also the use of carbonic acid.—Kustel's Roasting of Gold and Silver Ore.\*

\*This work may be had of Dewey & Co.'s, Book Department.

### The Sweetwater Mines.

H. G. Tobler, the well-known prospector, has returned from a trip to the Sweetwater mines. He spent nearly a week in inspecting the country round about what is known as the Charley Willard discovery. In answer to a question Mr. Tobler said he did not desire to say anything that would be likely to cause a rush to Sweetwater, nor did he desire to say anything to deter prospectors from going there. He thinks all the geological conditions of that section are favorable for a good mineral country, and says it is a good place to prospect. A ridge or chain of low hills skirt the valley, run north and south parallel to the main chain of the Sweetwater mountains and form the first

bench or plateau in the ascent of the range, other benches or plateaus rising successively one above the other far above the timber line and into the region of perpetual snow, or to an altitude of from 13,000 to 14,000 ft. above sea level. About the summit and far down the northerly slopes as well as on the higher plateaus, the snow is still very deep, and the face of the country is consequently not visible to the eye nor accessible to the pick of the prospector. There are about fifteen prospectors now in the vicinity of the Willard find. The foothill chain is of porphyry formation. Mr. Tobler says Charley Willard has a ledge that crops out prominently in this formation and looks well. He is uncertain as to the true width of this vein, and knew nothing of the assays it had given, but says it is a large vein of calico quartz shooting up from the porphyry country. Free Press.

### Our Scenery as One of Our Resources.

It is hard to bring magnificent scenes to measurement by the industrial standard. At first thought it would seem to be a profanation of nature, as estimating the painter's masterpieces by the square-yard is an insult to art. And yet this is something of an industrial age, and the suggestion that there is business in a thing, means more to many people than a hint of the presence of the loftiest sentiment or the deepest emotion. It is sometimes of advantage to a writer that there is such a vein in men's minds, for those of us who are denied the power to picture beauty or frame tributes to sublimity find our pencils moving very freely to the jingle of the coin. Therefore, with due respect to the poetry which others can voice in praise of California scenery, we would mention its value as one of the material resources of our State, which may be made to contribute far more than it does to the prosperity of our people.

It is conceded by those who have traveled that California has varied scenery of sea coast and plain, and hill and mountain, which no similar area on the globe can surpass. It is also true that these gems are arrayed in a setting of genial climates as peerless as themselves. In the vernacular of the showman, the State has peculiar "attractions," and people come from the uttermost parts of the world to see them. The result is that California has achieved an enviable position in art and literature; other results are that all visitors bring money which ministers to the success of our various productive enterprises, and many of them, won by the beauties of earth and air which they sought from afar, make the State their future abode, and bring their capital and their energy to aid in the development of our resources. In any way in which it may be viewed, California scenery is of inestimable value to her name and fame, and as an agency in industrial development, should not be overlooked.

We all know that Switzerland, Bavaria, Savoy, portions of Austria and France and other countries, derive a large part of their revenue from the expenditures of tourists. France, it is urged by some, could never have paid the enormous war indemnity to Prussia but for the steady tide of tourists pouring into her gates and dispensing their wealth upon all classes of producers. California can surpass all these European countries in embodiments of the sublime and the beautiful. The Alps, with all their glaciers and wonderful heights, have no such vertical walls or magic waterfalls as Yosemite. They have no El Capitan that would require 30 Palace Hotel buildings, one above the other, to form the corner wall. They have no South Dome, upon whose vertical edge one can sit and his limbs will hang over a precipice of 5,000 ft. And these are but items in the great list of wonders in the valley. Beyond the confine northward and southward to the ends of the State there are other scenes which entrance the beholder and dwell in his speech to the end of his life.

It is eminently fitting that the State should have a care for the perpetuation of its natural inheritance, and should prepare for continual benefits from its unceasing and increasing charm for tourists. That our scenery is each year yielding us returns can be seen by the report of the Yosemite Valley Commission, and what is learned from the record of the valley is to a certain extent applicable to all our greater scenes. J. M. Hutchings, the able guardian of the valley, and whose voice and pen first introduced its grandeur to the world, in his report last December, shows that 25,518 persons had visited the valley during 16 years. These persons spend during their stay in the State, and irrespective of railroad fares, etc., an average of \$600 each, which being distributed among the smaller industries of the State has produced much comfort to many of our people. It may be fairly expected that the opening of new railroads from the East to this coast and the increased travel which will result, will make our valley resource still more valuable.

It is wise therefore that the State of California into whose charge the valley has been given, should take measures to fit the region for the fullest enjoyment of tourists. There will be \$25,000 expended for the improvement of the valley, the purchase of trails, etc. This sum judiciously expended as we expect it will be, will add greatly to the attractiveness of the valley.



MECHANICAL

PROGRESS.

Straw Lumber—Its Economy.

We have already, in these columns made allusion to the new device of manufacturing lumber from straw—the invention of Mr. S. H. Hamilton of Lawrence, Kansas. Mr. Hamilton had worked up quite a business; when, a short time since, his factory was destroyed by fire. He was turning out, at the time, 20,000 ft. a day and had orders on hand for about 10,000,000 ft. The *Northwestern Lumberman*, speaking of this novel manufacture, says:—

“There can be no question that the straw lumber is admirably adapted to many kinds of finishing work, barrels, table and counter tops, fine doors and ornamental work, and we are assured that it can be produced and sold in competition with the finer grades of pine, or in competition with wide walnut, at about one-half the price of the latter. The standard manufacture is in widths of 32 inches, a length of 12 ft., and a thickness corresponding to that of surfaced boards. These dimensions may be varied to suit such orders as may be given, and embrace any width, length or thickness. Unlike lumber, however, narrower widths are the most costly. This straw lumber may be ripped with the hand-saw or upon the buzz-saw; may be run through the sticker for the manufacture of moldings, and takes a nail or screw about as well as oak. It may be finished with varnish or paint, and is susceptible of a high polish. It is water and practically fire proof, being manufactured under 500° of heat, and we are assured has been boiled for some hours without any apparent change of structure. Its tensile strength is greater than that of walnut or oak, and its weight about one-fifth greater than the former when dry. It is made from any kind of straw, including hemp and flax fiber—in fact, from any material that will make pulp—and a ton of straw will produce 1,000 ft. of boards. This pulp is rolled into thin sheets, a number of which, corresponding with the thickness of the lumber desired, are placed together with a peculiar cement which is claimed to be water proof, and are then rolled under a pressure sufficient to amalgamate them into a solid mass, which may be worked with a plane if desired.

“When it is remembered that it takes 100 years to grow a tree to maturity snitting it for commercial purposes, and a tree producing 32-inch lumber will require fully twice that time, while 20,000 ft. per acre is a large yield under the most favorable circumstances, it will at once be realized that where 2,000 ft. can be taken from an acre of ground for an indefinite number of years, the process which enables such a result to be accomplished and which will yield a really valuable lumber, is one of vast importance. We look for valuable results in the future in the manufacture of lumber from what is practically a waste material, but which will be produced in endless quantities so long as the United States maintains its character as a grain-producing country.”

The Art of Grinding Tools.

There seems to be a great number of workmen who pay not the slightest regard as to how a tool should be ground to do good service. A hasty examination of some of the tools, as they lie on the lathe board, will convince the intelligent workman of this fact, that many tools are carried to the grindstone to be ground, but from want of knowledge of the art of properly grinding the tool, are brought back unimproved, and one by one placed in the tool-post, ready to wrestle with the article to be operated upon, and the power which is struggling to overcome the combativeness of the tool. Now and then the belt slips from sheer exhaustion. How often this happens in the workshops need not be told to the mechanic who, often out of pure sympathy for the operator, now and then gives him a few points in grinding a tool, so that it will not require more than one-tenth the power to properly do the work. More than one-half of all the wear and tear and breakage, and bother of dull tools, comes from a lack of proper knowledge and practice in grinding. All steel, however highly refined, is composed of individual fibers, laid lengthwise in the bar, and held firmly together by cohesion. In almost all forms of cutting implements, the steel portion which forms the edge, is laid in and welded to the iron longitudinally, so that it is the side of the bundle of fibers, hammered and ground down, that forms the edge. Hence, by holding on the grindstone all edge tools, as axes, drawing-knives, knives of reapers, scythes, knives of straw cutters, or tools in general use by mechanics and workmen, in such a manner that the action of the stone is at right angles with the plane of the edge, or in plainer words, by holding the edge of the tool across the stone, the direction of the fibers will be changed so as to present the ends instead of the side, as the cutting edge. By grinding in this manner, a finer edge is set, the tool is ground in less time, holds an edge a great deal longer, and far less liable to nick out and break. A little practice in grinding, with a knowledge of what the tool has to do, will in due time reduce the number of ngly looking tools so often found in the workshop.—*E. E. Simonds, in American Machinist.*

Steam Room in Boilers.

A contributor to *London Engineering* writes as follows:—

“I wish to ask a sufficient explanation for the fact that locomotive boilers are every day working unsatisfactorily with about one-seventh of the proportion of steam room per indicated horse-power usually found in ordinary marine boilers. Taking a number of recent examples of marine boilers by first class makers, the proportion of steam room per actual indicated horse-power developed in continuous running at full speed, varies between the extremes of one-half and one cubic foot, or say a mean of .75 of a cubic foot. On the other hand, the locomotive boiler of a first class torpedo boat has fifty-seven cubic ft. of steam room, while the indicated horse-power is 450, which gives .127 cubic ft. per indicated horse-power, but about one-sixth of the previously mentioned proportion in marine boilers of ordinary construction. The boiler of a powerful goods engine belonging to one of our principal railway companies has 42 ft. of steam room, which, estimating the indicated horse-power developed at full speed at 500, gives .08 of a cubic foot per indicated horse-power, or one-ninth the proportion obtained in marine boilers. This difference is rendered more striking when it is remembered that at least 50% more steam per horse-power is drawn from the locomotive boiler with a simple high pressure engine than in the case of the marine boiler, with compound condensing engines. The assumption that the amount of steam room should be proportioned to the amount of steam drawn from the boiler in a unit of time, that is, to the indicated horse-power approximately, evidently is not applicable to all cases. To what, then, shall the amount of steam room be proportioned?”

This letter opens a question which can, with perfect propriety and the certainty of eliciting information, be discussed here as well as in England, for, while our practice is somewhat different, the natural laws remain the same.

Recasting Old Bearings.

This frequently becomes necessary in the practice of every wood-worker and should be done understandingly.

To remove the old metal: Take a narrow cold-chisel and cut a groove entirely through the middle of the old babbitt, longitudinally. Each half can then be removed easily and in one piece. Extract from the cap in the same manner. Clean the cavities thoroughly.

If the box is of the self-oiling pattern, wedge the opening of the oil-holes completely full of wood and projecting up enough to touch the shaft when the latter is in position.

Line up, packing the end of the boxes with card-board, that the shaft may not bear against iron at any point. Also pack about 1-16 inch of paste-board against the shaft, on each side, under the cap, which must be screwed down firmly. Use putty or stiff clay to stop all cracks.

The babbitt metal is ready for use when heated sufficiently to char a pine stick. When practicable, both sides of the bearing should be poured simultaneously, as there will be less danger of springing the shaft. Do not have the metal too hot, as the shrinkage will be in proportion to the temperature. Have everything perfectly dry, and a free gate for the escape of gases, if you would avoid explosion.

Remove cap, trim all edges rounding, and with proper tools open all oil holes. Finally, it is best, although not always essential, to scrape the bearing to a fit.

**SPECIAL KINDS OF CAST STEEL.**—A special steel for taps, called mild-centered cast steel, is made by converting a cogged ingot of very mild cast steel, so that the additional carbon only penetrates a short distance. These bars are afterwards hammered or rolled down to the size required, and have the advantage of possessing a hard surface without losing the toughness of the mild center. Another special steel, somewhat analogous to mild-centered cast steel, is produced by molting a hard steel on to a slab of iron or very mild steel heated hot enough to weld with the molten steel, so that a hard may be produced, one-half of which is iron and the other half steel, or three-fourths iron, and one-fourth steel, as may be required. A third kind of special steel, which is used for turning tools, for chilled rolls, magnets, and some other purposes, is made by adding a certain percentage of wolfram, or, as the metal is more generally called, tungsten, sometimes with and sometimes without carbon, sometimes to such an extent that it can be used without hardening in water. Special steel of this kind is the finest grained that can be produced, but it is so brittle that in the hands of any but exceptionally skilled workmen it is useless. The addition of chromium, instead of wolfram, has somewhat the same effect.—*Ironmonger.*

**AN INDUSTRIAL PROBLEM.**—One of the great industrial problems to be solved by the American people is how to adjust the relations of machinery and minutely divided labor, so as to secure on the one hand the best and cheapest productions, and on the other hand to counteract the tendency of specialization to narrow the scope and value of the workman's life. Our operatives are also citizens and sovereigns; and society cannot afford to spoil the citizen to save a fraction of a cent on a yard of cotton or a few dollars on the price of a ship or an engine.

SCIENTIFIC

PROGRESS.

The Importance of Science.

Mr. Quatrefores, in an address delivered some time since, at Bordeaux, before the French Society for the Advancement of Sciences, well observed: “All men cannot be expected to enlist under the banner of professional science. But all may and must acquire scientific notions, sufficient at least to understand the utility of the intervention of special men, and to be able to judge when that intervention becomes necessary. Science is nowadays omnipresent, and tends more and more to become the sovereign of the world. What industry is there that does not want the help of the engineers, and would remain content with the progress already accomplished? What branch of manufacturers would decline this help of chemistry? What medical practitioner, worthy of that name, would consent to forsake physiology, that complex science, the offspring of chemistry, and would do without natural philosophy, any more than anatomy? What intelligent agriculturist does not understand that the problems of culture and production are essentially questions belonging to zoology, botany, geology and chemistry? And in this great city, one of the queens of universal commerce, what merchant would deny the importance of geography?”

“Science is as indispensable to the military man as it is to the manufacturer, the medical practitioner, and the agriculturist. I am not going to undervalue the share that, in war, falls to inspiration and gallantry. But inspiration must be enlightened by study, and courage must be aided by weapons equal in efficiency and power to those of the enemy. No more than the agriculturist or the manufacturer, can the officer master all the sciences the help of which is necessary to his profession. He cannot be expected to solve by himself all the problems raised by his single art. It is essential that he should first ascertain those problems, and confidentially appeal to scientific men, pointing out to them the application he wants. Let us, therefore, stir up the intellect of all men. Surely, we may hope to bring to light many treasures which, for want of the opportunities which it will be our object to create, might remain buried in the darkness of ignorance.”

“You see, gentlemen, that our task will be fulfilled only when every man exercising any influence on his neighbor, or having any amount of leisure on his hands, shall have become an enlightened friend of science; when the least among laborers shall know what principles regulate the processes and the practice of his handicraft. This is enough to make you understand that our work is one of time. Most of us will not see its ultimate end, but we shall bequeath this noble task to our sons, as a sacred heirloom, and you may rest assured that it will be accomplished by them if not by us. Look at the results obtained in England by our eldest sister, the British Association. It is owing to its action that part of the population of England has undergone a transformation. The sons of fox-hunting squires are now geologists, philosophers, botanists, archaeologists, etc. It is a banker who presides over the Anthropological Institute, and a brewer who is at the head of the Astronomical Society. The British Association reckons its members by thousands, and all the principal towns dispute the honor of its visits. Let us, then, begin our work with confidence; let us spare no efforts, for none shall be in vain. We know now, that in the physical world there is no loss of power, no loss of matter. It is so, and even to a more absolute degree, in the moral world. Will is also a power, a power that increases and multiplies by transforming the minds of men, like a ferment. We have the will for good; let us resolutely apply it, and we shall develop the intellects and raise the hearts of men by the diffusion of learning.”

**SMOKE AND STEAM UNDER THE MICROSCOPE.** L. J. Bodaszewsky calls attention to the rapid oscillatory movements which are disclosed by the microscope in the smoke of burning paper, wood, cigars, etc., when concentrated sun or electric light is thrown upon them through a lens. The particles are of a spherical form, and they are continually darting against each other, so as to represent very strikingly the motion of gas molecules according to the kinetic theory. Similar movements are observed in the vapors of nitric, sulphuric and phosphoric acids, sulphur, ammonia, etc., when examined under the microscope by the light of a glowing platinum wire.—*Dingler's Journal.*

**WORMWOOD AS AN INSECT-PUCE.**—M. Poyrot having observed that the immense tracts of wormwood (sagebrush), upon the American plains are free from insects of every description, is experimenting with the plant as a preventive of phylloxera. He finds no difficulty in cultivating the wormwood, and he proposes to mix the stalks with manure, or simply bury them in the ground in the neighborhood of the vines. His suggestions have been sent to the Phylloxera Committee of the French Academy.

**MOLDING IRIIDIUM.**—Mr. John Holland, of Cincinnati, has discovered the process of fusing and molding iridium, which heretofore has been considered impossible. Phosphorus is the chief element.

Unrecognized Qualities in Charcoal.

Among the numerous and varied properties possessed by charcoal, says the *Scientific News*, there is one—one, too, of the most wonderful—which does not seem to be adequately recognized, probably from its being imperfectly known, except to physicists. It is that of being able to condense and store away in its pores many times its own bulk of certain gaseous bodies, which it retains, thus compressed in an otherwise unaltered condition, and from which they can be withdrawn, as required, as from a reservoir.

That eminent scientist, M. Saussure, undertook the task of a systematic examination of this subject, with a result which will prove surprising to the general reader. Operating with blocks of fine boxwood charcoal, freshly burnt, he found that by simply placing such blocks in contact with certain gases, they absorbed them in the following proportions:

	Volumes.
Ammonia.....	90
Hydrochloric acid gas.....	85
Sulphurous acid.....	65
Sulphureted hydrogen.....	65
Nitrous oxide (laughing gas).....	40
Carbonic acid.....	35
Carbonic oxide.....	9.42
Oxygen.....	9.25
Nitrogen.....	6.50
Carbureted hydrogen.....	5
Hydrogen.....	1.75

It is this enormous absorptive power that renders of so much value a comparatively slight sprinkling of charcoal over dead animal matter as a preventive of the escape of the odors arising from decomposition. A dead dog having been placed in a box in the warm laboratory of an eminent chemist, and covered with charcoal to the depth of between two or three inches, could not be discovered to have emitted any smell during several months, after which time an examination showed that nothing of the animal remained but the bones and a small portion of the skin. To the large excess of oxygen over the nitrogen in the atmosphere, which, according to the above table, was absorbed by the charcoal, and which thus rendered harmless the noxious vapors given off by the carcass as they were being absorbed, is doubtless owing to the fact above stated and the further fact of the charcoal never becoming saturated.

In a box or case containing one cubic foot of charcoal may be stored, without mechanical compression, a little over nine cubic feet of oxygen, representing a mechanical pressure of one hundred and twenty-six pounds to the square inch. From the store thus preserved the oxygen can be drawn by a small hand pump.

From the fact of the charcoal absorbing oxygen in so much greater proportion than nitrogen, we have here a means of utilizing its discriminative powers of selection in obtaining unlimited supplies of oxygen from the atmosphere, which contains nitrogen five times in excess of its oxygen, or 20%, whereas by the separating or selective powers of the charcoal the mixed gases capable of being extracted from it contain over 60% of oxygen. It only suffices to withdraw this now highly oxygenized air into another vessel of charcoal, by the further exposure to which the proportion of oxygen will be increased to a still greater extent. This indicates a most feasible means by which atmospheric air can be decomposed in such a way as to provide a cheap supply of oxygen.

One can not readily recognize the fact, which is nevertheless true, that the condensing power of charcoal, as applied to ammonia, is equal to what would be obtained by subjecting this gas to a pressure of nearly 1,260 pounds on the square inch.

**NEW SUBSTANCE IN THE ROOT OF THE COTTON PLANT.**—Mr. W. C. Staehle, an American chemist, has discovered a curious new product in the bark of the root of the cotton plant (*Gossypium herbaceum*). When the bark of this root is exhausted by alcohol of the specific gravity of 0.84, a dark, reddish-brown liquid is obtained, which when distilled to recover the spirit, leaves a resinous matter which amounts to 8% of the original weight of the bark. The new product thus obtained appears black and shining, but when pulverized takes the color of the cochineal. It dissolves in 14 parts of alcohol, 15 parts of chloroform, 23 parts of ether, and 122 parts of benzol. It dissolves also in caustic alkalies, and is precipitated from these solutions by acids. Hydrate of potash colors it green. Sulphuric acid dissolves it with a red brown color. Its other properties have not yet been examined.

**DR. SIEMENS** proposes a new gas for heating purposes on shipboard. Instead of heating the retorts by means of coke in ordinary furnaces, the raw material left in the retorts after the gas has been expelled, is subjected to the influence of volumes of steam. The steam being decomposed by the latent heat of the material, passes as gas of enormous caloric power around the retorts, and so acts as an active means for the distillation of gas for illuminating purposes.

**SATELLITE GEOLOGY.**—In presenting the Annual of the Bureau of Longitudes, M. Faye described, as usual, the improvements which have been introduced into the volume. The one which will probably attract the most general attention for its novelty is a notice by M. Faye himself upon the comparative geology of the moon and the earth, with illustrative plates,



## Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 13.	Week Ending May 19.	Week Ending May 26.	Week Ending June 2.
Alpha.	3.90	3.30	3.15	2.90
Alta.	4.05	3.30	3.30	3.30
Andes.	2.30	1.70	2.10	1.90
Albion.	4.40	2.40	3.30	2.80
Argenta.	65c	50c	40c	35c
Adelphi.	2.35	1.80	2.95	2.15
Belcher.	1.00	1.00	1.00	1.00
Belmont.	1.00	1.00	1.00	1.00
Best & Belcher.	1.00	1.00	1.00	1.00
Bullion.	1.00	1.00	1.00	1.00
Bechtel.	1.00	1.00	1.00	1.00
Belle Isle.	1.00	1.00	1.00	1.00
Bodie.	1.00	1.00	1.00	1.00
Benton.	1.00	1.00	1.00	1.00
Bulwer.	1.00	1.00	1.00	1.00
Boston.	1.00	1.00	1.00	1.00
Black Hawk.	1.00	1.00	1.00	1.00
Belvidere.	1.00	1.00	1.00	1.00
Booker.	1.00	1.00	1.00	1.00
Caledonia.	1.00	1.00	1.00	1.00
California.	1.00	1.00	1.00	1.00
Challenge.	1.00	1.00	1.00	1.00
Chollar.	1.00	1.00	1.00	1.00
Confidence.	1.00	1.00	1.00	1.00
Con Imperial.	1.00	1.00	1.00	1.00
Con Virginia.	1.00	1.00	1.00	1.00
Crown Point.	1.00	1.00	1.00	1.00
Columbus.	1.00	1.00	1.00	1.00
Champion.	1.00	1.00	1.00	1.00
Concordia.	1.00	1.00	1.00	1.00
Con Pacific.	1.00	1.00	1.00	1.00
Derby.	1.00	1.00	1.00	1.00
E. M. Diablo.	1.00	1.00	1.00	1.00
Essex.	1.00	1.00	1.00	1.00
Eschschuer.	1.00	1.00	1.00	1.00
Grand Prize.	1.00	1.00	1.00	1.00
Golden Gate.	1.00	1.00	1.00	1.00
Goodshaw.	1.00	1.00	1.00	1.00
Gould & Curry.	1.00	1.00	1.00	1.00
Hale & Norcross.	1.00	1.00	1.00	1.00
Head Center.	1.00	1.00	1.00	1.00
Huesey.	1.00	1.00	1.00	1.00
Independence.	1.00	1.00	1.00	1.00
Jules.	1.00	1.00	1.00	1.00
Jurico.	1.00	1.00	1.00	1.00
Jackson.	1.00	1.00	1.00	1.00
Jupiter.	1.00	1.00	1.00	1.00
Kentuck.	1.00	1.00	1.00	1.00
Kosuth.	1.00	1.00	1.00	1.00
Lady Eliza.	1.00	1.00	1.00	1.00
Lady Wash.	1.00	1.00	1.00	1.00
Leviathan.	1.00	1.00	1.00	1.00
Leeds.	1.00	1.00	1.00	1.00
May Belle.	1.00	1.00	1.00	1.00
Modoc.	1.00	1.00	1.00	1.00
Manhattan.	1.00	1.00	1.00	1.00
Martin White.	1.00	1.00	1.00	1.00
McClinton.	1.00	1.00	1.00	1.00
Memo.	1.00	1.00	1.00	1.00
Mexican.	1.00	1.00	1.00	1.00
Mt. Diablo.	1.00	1.00	1.00	1.00
Morning Star.	1.00	1.00	1.00	1.00
Mt. Potosi.	1.00	1.00	1.00	1.00
Norway.	1.00	1.00	1.00	1.00
New York.	1.00	1.00	1.00	1.00
Northern Belle.	1.00	1.00	1.00	1.00
North No. 1.	1.00	1.00	1.00	1.00
Navajo.	1.00	1.00	1.00	1.00
Oberlin.	1.00	1.00	1.00	1.00
Original Keystone.	1.00	1.00	1.00	1.00
Oron.	1.00	1.00	1.00	1.00
Paris.	1.00	1.00	1.00	1.00
Potosi.	1.00	1.00	1.00	1.00
Queen Bee.	1.00	1.00	1.00	1.00
South Bulwer.	1.00	1.00	1.00	1.00
Savage.	1.00	1.00	1.00	1.00
Seg Belcher.	1.00	1.00	1.00	1.00
Silver Nevada.	1.00	1.00	1.00	1.00
Silver Hill.	1.00	1.00	1.00	1.00
Silver King.	1.00	1.00	1.00	1.00
Succor.	1.00	1.00	1.00	1.00
Summit.	1.00	1.00	1.00	1.00
Scorpion.	1.00	1.00	1.00	1.00
Solid Silver.	1.00	1.00	1.00	1.00
South Bodie.	1.00	1.00	1.00	1.00
South Standard.	1.00	1.00	1.00	1.00
Syndicate.	1.00	1.00	1.00	1.00
Tipton.	1.00	1.00	1.00	1.00
Tuscarora.	1.00	1.00	1.00	1.00
Union Con.	1.00	1.00	1.00	1.00
Utah.	1.00	1.00	1.00	1.00
Ward.	1.00	1.00	1.00	1.00
Wales.	1.00	1.00	1.00	1.00
Yellow Jacket.	1.00	1.00	1.00	1.00

## Sales at S. F. Stock Exchange.

Thursday A. M., June 2.	865	Slerra Nevada.	17 1/2
200 Alpha.	4.30	10 Seg Belcher.	64
445 Alta.	3.40	430 Scorpion.	2 1/2
1000 Andes.	2.40	700 Silver Hill.	15c
510 E. & Belcher.	1.50	100 Solid Silver.	25c
645 Belcher.	2.65	300 Sierra.	20c
640 Bullion.	90c	475 Union.	14 1/2
350 Benton.	75c	57 Utah.	10 1/2
1130 California.	1.10	100 Ward.	25c
720 Con Virginia.	1.10	750 Yellow Jacket.	25c
500 Chollar.	2.60		
310 Crown Point.	2.30		
650 Con Imperial.	25c		
180 Confidence.	25c		
100 Caledonia.	25c		
500 Exchequer.	1.10		
715 Gould & Curry.	1.45		
250 Golden Gate.	1.20		
545 Hale & Norcross.	1.30		
250 Justice.	95c		
1040 Julia.	55c		
125 Kentuck.	25c		
340 Mexican.	1.50		
230 New York.	20c		
1075 New Wells Fargo.	50c		
165 Ophir.	85c		
430 Overman.	1.30		
300 Potosi.	35c		
740 Savage.	40c		

**QUICKSILVER.**—The quicksilver market is very quiet, with but very little stock on hand, and 37 1/2 cents the best price offered. Since the first of May exports have amounted to 2,505 flasks, valued at \$73,615. The receipts of quicksilver in this city since the 1st of January, aggregate 20,108 flasks. As to quicksilver flasks, new ones are worth \$1.25 and old ones \$1.05.

At Cerro Gordo, Inyo, the Swansea Co. has been overhauling their slag pile at the old furnace on the lake, with astonishing results. Thousands of tons of rich, half-smelted ore and metal have been sorted out.

The Miners' mill property at Lookout, Inyo county, has been sold by Belshaw & Co. to an Arizona company. It is to be removed to a point near Grapevine, on the Mohave river.

The Arizona Journal says that from the 19th to the 21st inst., inclusive, the product of the Copper Queen smelter was 31,257 lbs. of copper.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

## ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Bullion M Co	Nevada	19	60	May 19	June 22	July 13	J M Brazell	328 Montgomery st
Belvidere M Co	California	11	25	May 17	June 17	July 16	C V Hubbard	310 Pine st
Belcher S M Co	Nevada	27	75	Apr 12	May 17	June 7	Joe Crockett	327 Pine st
Caledonia M Co	Nevada	25	25	May 3	June 7	July 6	E Wescor	419 Montgomery st
Con Imperial M Co	Nevada	15	10	Apr 18	May 4	June 14	W E Dean	309 Montgomery st
Equitable T & M Co	Utah	25	15	May 10	June 17	July 11	C J Collins	512 Montgomery st
Fresno G M Co	California	2	15	April 25	June 1	June 15	D Cuck	309 Montgomery st
Grand Prize M Co	Nevada	5	25	May 19	June 30	July 20	E M Hale	327 Pine st
Hale & Norcross M Co	Nevada	69	50	May 10	June 15	July 6	J F Lightner	309 Montgomery st
Julia Con M Co	Nevada	15	30	Apr 27	June 2	June 24	H A Charles	419 California st
Kentuck M Co	Nevada	15	30	May 3	June 7	June 23	A C Stuart	234 Montgomery st
Lady Washington M Co	Nevada	2	15	April 15	May 20	June 9	W H Watson	302 Montgomery st
Manmoth M Co	California	2	10	Apr 23	May 25	June 13	A W Rose Jr	302 Montgomery st
Mt Potosi Con M Co	Nevada	6	25	Apr 6	May 13	June 6	E A Holmes	318 Pine st
Mono G M Co	California	12	50	May 19	June 24	July 14	W Stuart	320 Sansome st
Oro M Co	California	8	10	June 1	July 5	July 24	Wm Letts Oliver	328 Montgomery st
Paradise Valley M Co	Nevada	23	10	May 8	June 15	June 15	H Lester	308 California st
Phoenix M Co	Nevada	23	10	May 8	June 15	June 15	W E Dean	309 Montgomery st
Silver Hill M Co	Nevada	16	25	May 7	June 10	June 28	E L Parker	309 Montgomery st
Sierra Nevada S M Co	Nevada	68	1 00	Apr 22	May 26	June 15	W H Lant	309 Montgomery st
Yolla Con M Co	California	13	15	May 11	June 17	July 7	Merced Otley	Gold Hill
Yellow Jacket S M Co	Nevada	41	1 00	May 9	June 14	July 6		

## OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALR.	SECRETARY.	PLACE OF BUSINESS.
Benton Con M Co	California	5	25	May 21	June 24	July 12	W H Watson	302 Montgomery st
Boston Con M Co	California	1	30	Apr 26	May 1	June 21	F E Luty	330 Pine st
Butte Con M Co	Nevada	9	10	Apr 26	May 3	June 14	R L Taylor	230 Montgomery st
Day Silver M Co	Nevada	8	10	May 11	June 16	July 9	J W Pew	310 Pine st
Derbec Blue Gravel M Co	California	8	10	May 11	June 16	July 9	T Wetzel	522 Montgomery st
Excelsior Deep Gravel M Co	California	16	25	May 25	June 27	July 14	D B Osholm	327 Pine st
Excelsior Enterprise M Co	Nevada	2	10	Apr 23	May 20	June 10	W H Allen	30c Pine st
Gold Lead M Co	Nevada	2	10	Apr 23	May 20	June 10	D Frankides	331 Montgomery st
Golden Gate Con M Co	California	4	50	May 19	June 23	July 14	J T McGeehegan	318 Pine st
Iowa M Co	Nevada	13	60	Apr 23	May 30	June 18	C S Leavitt	411 1/2 California st
Iron Old Con M Co	California	1	10	Apr 23	May 30	June 18	A Dett	309 Montgomery st
Lodi M Co	California	1	10	Apr 23	May 30	June 18	A B Paul	328 Montgomery st
Lord of Lorn G M Co	California	1	15	Apr 19	May 31	June 28	R N Van Brunt	318 Pine st
May Flower G M Co	California	11	10	Apr 12	May 18	June 8	J Morizo	328 Montgomery st
McMillen M Co	Arizona	3	20	Jan 12	June 12	July 27	J Morizo	328 Montgomery st
North Standard G & S M Co	California	15	06	May 3	June 1	June 25	C Van Dyck Hubbard	310 Pine st
Oakland G M Co	California	15	06	May 3	June 1	June 25	R D Hopkins	436 Montgomery st
Prospect G & S M Co	Nevada	8	10	Apr 26	May 31	June 20	H P Bush	431 California st
Peck M Co	Arizona	3	1 00	Apr 14	May 23	June 14	Chas T Bridge	224 California st
Red Hill Hydraulic M Co	California	4	15	May 10	June 10	June 27	A B Paul	328 Montgomery st
Silver Angel G M Co	California	3	05	Apr 19	May 30	June 9	Lewis Mills	607 Washington st
Swansea M Co	California	2	05	Apr 5	May 14	June 6	M Wheeler	320 Sansome st
Silver City M Co	Nevada	2	10	May 2	June 6	June 27	A K Durbrow	309 Montgomery st
Three Brothers S M Co	Arizona	1	30	May 25	June 28	July 20	C Meade	324 Pine st
Union Gravel M Co	California	17	50	May 7	June 15	June 29	H Pichor	320 Sansome st
Wolverine Gravel M Co	California	2	10	May 31	June 1	Aug 1	E J Blanding	325 Front st

## MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Alpha Con M Co	Nevada	W Willis	309 Montgomery st	Annual	June 20
Bodie Con M Co	California	W H Lant	309 Montgomery st	Annual	June 6
Blue Bird Con M Co	California	W B Knight	10 Market st	Annual	June 6
Caledonia G M Co	California	D B Chisholm	327 Pine st	Annual	June 7
Cashier M Co	Nevada	D B Chisholm	327 Pine st	Annual	June 7
Clara Con M Co	Nevada	D B Chisholm	327 Pine st	Annual	June 7
Excelsior Deep Gravel M Co	Nevada	D B Chisholm	327 Pine st	Annual	June 7
Gould & Curry S M Co	Nevada	W Ennis	331 Montgomery st	Annual	June 7
Newcastle G M Co	California	E G Mathews	318 Pine st	Annual	June 7
Peck M Co	Utah	D B Chisholm	327 Pine st	Annual	June 7
Sierra Nevada M Co	California	A W Rose, Jr.	309 Montgomery st	Annual	June 21
Sierra Nevada M Co	California	J T Newell	309 Montgomery st	Annual	June 21
McElroy Gravel M Co	California	L Little	607 Washington st	Special	June 7
Mint M Co	Nevada	H H Haskell	528 California st	Annual	June 24
Tybo Con M Co	Nevada	W Parrish	318 Pine st	Annual	June 7
Tilden M Co	Nevada	E U Masten	309 Montgomery st	Annual	June 7

## LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Eschschuer Con M Co	Nevada	W W Taylor	37 Nevada Block	50	May 20
Furber Do Smet M Co	Dakota	H Dean	20 New York	50	May 10
Golden Gate M Co	Cal	W Willis	309 Montgomery st	25	May 16
Northern Belle M & M Co	California	W Willis	309 Montgomery st	25	May 16
Silver King M Co	Arizona	J Nash	315 California st	25	May 16
Standard Con M Co	California	W Willis	309 Montgomery st	75	May 12
Western M Co	California	O S Curtis	309 Montgomery st	75	May 12
Navajo M Co	Nevada	E M Hall	327 Pine st	25	Mar 25

## The Mining Share Market.

Prices are rather high in the stock market just at present, though, as far as we know, there is no special occasion for it. Some say that the "bonanza crowd" are trying to make a deal through other people's agency. The Virginia Enterprise contains the following account of operations in the leading Comstock mines: "Next week the crosscut will be started up in the Sierra Nevada, and this will soon be followed by the completion of the snmp of the Union shaft and the beginning of operations at the 2700 level.

"At the California and Consolidated Virginia, they are now ready to begin prospecting a block of ground reaching up from the 2500 to the 2000 level; indeed, prospecting has already been commenced in a drift that is being run north from No. 1 winze at a depth of 30 ft. below the 2000 level. This drift is following a body of quartz that appears to be making northward. Next week the Gould & Curry and Best & Belcher shaft will again be going down into the very promising ground into which it was just entering when sinking was discontinued to rearrange the pumping apparatus, preparatory to pumping into the



40 ft on the Iron Silver mine at Silver Lake.



## The Placer County Iron Mine.

### A Flourishing New Industry.

We take the following from the Grass Valley Union:

For the past year there has been occasional reference in the press to the operations of a San Francisco company that was engaged in the erection of works and the building of charcoal kilns for the smelting ores found between Bear river and Clipper Gap, in Placer county. The works reached completion and the smelting of ore was commenced a few weeks ago, since which time there has been a regular and uninterrupted daily production of iron bars or "pig metal." From the fact that an important part of the company's operations are conducted on the Nevada as well as the Placer side of the river the enterprise is one of great interest to the citizens of both counties, and this was sufficient inducement for a representative of the Union to make a visit to the different works of the company a few days since, for which he feels that he was fully compensated in witnessing the magnitude as well as the novelty of the structures connected with this enterprise.

#### The Iron Ore.

The existence of iron ore at this point, where the furnace has been erected (4 miles from Clipper Gap and 6 from Auburn), has long been known, as the writer hereof was on the ground twenty years ago, when at that time a location of 160 acres of the land had been made for the purpose of establishing a claim to the ore, which was found at different points on that tract. The then owner realized that at some day the ore could be utilized, although then and for many subsequent years it has been valueless. About that time some of the ore was taken to Sacramento and smelted in the cupola furnace of Goss & Lanher's foundry, which showed as high as 85% of metal. Some of it was so pure that it could be beaten on an anvil. Subsequently, several other 160 acre locations were made, and the ownership passed to Messrs. Applegate, Brown & Myres, of Placer county. Various efforts were made subsequent to the construction of the Central Pacific Railroad Company to induce that Company and other parties to establish a smelting furnace on the land, but until the property passed to the present ownership, which consists principally or entirely of Messrs. E. Judson, A. P. Hotelling and Irving M. Scott, of San Francisco, nothing was done that took a definite and practical shape. These gentlemen being satisfied as to the quality and extent of the iron ore obtained title to the land and commenced active operations about one year ago. As the ore was of the kind known as "magnetic," charcoal was the desirable fuel to be used in its reduction, and about the first movement was to secure a large amount of wood land and to build

#### Patent Charcoal Kilns

To secure a supply of fuel by the time the furnace could be erected. The kilns were to be of brick, and brick sufficient for twenty kilns was burned in the vicinity, and the kilns were constructed during last season. Six of these kilns are near the river on the Placer county side and fourteen on the Nevada county side, in the southern portion of Grass Valley township. Of the fourteen kilns on this side of the river eight are on the Sales ranch, and six two miles below, both locations being in a section of country that furnishes a large amount of timber of the kind usually found in the foothills, black and white oak and nut pine. The kilns are built in dome shape terminating at the top in a sharp peak. Near the top of each is a wide door, in which to receive the wood for burning, and on the opposite side, at the bottom, is a door of similar size from which to draw the coal when burned. The kilns are built in a row, each standing close to the other, and an elevated roadway is built with lumber on a level with the upper openings of the kilns upon which the wood wagons drive to discharge their loads. On a level with the lower doors of the kilns another wooden platform is constructed upon which the coal is drawn out, and up to which the coal wagons drive and are conveniently loaded. Each kiln holds 40 cords of wood, and in filling them the wood is laid in carefully. The wood is cut in cordwood lengths, and is put in from small limbs to logs two ft. in thickness. It takes 15 days in all to burn a kiln of coal, 5 days to put in the wood, and 5 to cool. Each kiln has a capacity of 2,500 bushels. The company owns the kilns and the wood, but the coal is burned under contract by Messrs. Eghert, Hayford & Co., of Colfax, who have established camps at each set of kilns, but make their principal one at Bear river, where they have established a store and have their principal stables for coal teams. They employ about 175 coal burners, woodchoppers and teamsters, and conduct the entire business of making and delivering the coal at the furnace, which enables the Iron Company to greatly simplify their business, and gives them no care except in the direct running of the smelter and the extraction of ore. The charcoal is delivered at the furnace at the rate of 8 cents per bushel. In going to the iron mine from this direction the charcoal kilns are first visited, and an idea obtained as to the magnitude of the whole enterprise in seeing the destruction that is being made of the timber, the big piles of coal ready for hauling, the men and teams employed, and

the great white domes of the kilns, which at first sight are a cause for surprise and curiosity. From the kilns on Bear river to the

#### Furnace

Is 2½ miles, which on approaching is discovered to be a combination of buildings, the tallest of which is about 50 ft. in height, and surrounds the stack or furnace. The actual height of the furnace proper is 47 ft., built of fire-proof brick and having an outside sheathing of heavy boiler iron. In this same building is the casting room, where the molten metal is cast into bars when run from the furnace. In one of the adjoining buildings is located two hydraulic elevators, by which the ore and charcoal is raised to the top of the furnace, and a rock breaker for reducing the ore to the proper fineness for the furnace. Another building contains the powerful engine which drives the blower for a hot-air blast, and a small engine that runs the rock-breaker. Alongside of the engine house is a brick structure which serves a novel purpose in the utilizing of the gas that is generated in the stack from the charcoal used in fusing the ores. This gas is conveyed by a large conductor leading down from near the top of the stack to a large gas receiver which is set alongside of the brick structure spoken of. From the receiver the gas passes into the furnace under the steam boilers and gives all the necessary heat to make the steam which runs all the machinery—no other fuel being used. The large pipe carrying cool atmospheric air from the blower passes through the brick structure which is filled with pipes heated with the gas, so that when the air reaches the bottom of the furnace, into which it is discharged at four different points, it is a powerful hot-air blast that constantly and strongly fans the flame in the furnace. This utilizing of the gas is very interesting as well as a novelty in iron manufacture, the adaptation being, we understand, but recent—in fact, there have been but five furnaces constructed on the plan of this, which represents the very latest improvements. All the machinery and the structures about the furnace are of the most substantial character, and look as if neither care nor money had been withheld in providing them. In feeding the furnace a charge of 800 pounds of iron ore which contains 25 pounds of marble rock for a flux, is put in at this top. This ore is raised up on the elevators in an iron barrow. After the ore a charge of 30 bushels of charcoal is put in, which is received in the same manner. These different charges are put in about 20 minutes apart, and thus the work goes on continuously, there being no cessation, as once the furnace is in blast it must be kept so unless every particle of its contents is drawn off. The furnace has a capacity for the manufacture of 40 tons of iron in 24 hours, but its present product is 25 tons, as the facilities for burning charcoal are not yet up to this full standard. The casting of the pigs is made twice a day. Up to the present time about 750 tons of metal have been cast, of which about 400 tons are awaiting shipment from the furnace. The iron made is rated No. 1, 2, and so on, according to appearance the workmen understand, but it is all good, and the high grades are said to be the best iron in the market, and will bring several dollars per ton more than the best Eastern or imported iron in the market.

#### The Iron Ore

Is found on the hillside, not more than 200 yards distant from the furnace, and so far as extracted, has been taken out from open cuts. The ore is of high grade, reaching over 80%, and has a short distance beyond hematite ore has been found that will reach 90%. In close proximity to this is a strong vein of marble, which makes a fine flux for the ore, otherwise, that or limestone would have to be procured elsewhere. Ore has been found on other portions of the tract, so that the company feel warranted in believing that the supply is inexhaustible.

The employees about the furnace number 80 white men (no Chinese are employed) whose average pay is \$2.50 per diem. The men work eight-hour shifts, with the exception of the miners, who work ten-hour shifts.

#### The new Town.

A short distance from the furnace, and safely away from its heat and dust, is the embryo town, which consists of a large hoarding and five or six neat houses, built on the opposite sides of a wide street. The location is well chosen, as the site is smooth, and the natural growth of the forest trees give it a cool and homelike air. The town has had no christening yet, and is included in the general name of the neighboring improvements, "The Iron Mine."

#### A Great Enterprise.

A visitor can not but be struck with the importance of the enterprise, its evident cost, and the promise it gives of the permanent establishment of an industry right here in the foothills that is full of promising value to the surrounding country. It is wholly unlike gold-mining, and seems rather out of place down among the grass and wood ranches, but it looks as if it was a business enterprise in which the owners had no idea of failure. It is the only thing of the kind in the State, and a visit to it will compensate any one for the trouble, however far they might have to travel.

James M. White, of Rochester, New York, an experienced and skillful iron manufacturer, is general manager of the furnace and works, whose assistant in the clerical duties is Mr. E. W. Cowles, of San Francisco.

## Auriferous Slate Deposits of the Southern Mining Region.

[Read by P. H. MELL, JR., M. E., of Auburn, Ala., before the American Institute of Mining Engineers.]

Can the auriferous slate deposits of the Southern mining region ever be successfully worked? is a question that has been often asked me by persons seeking investments in Southern mines. As the subject is one that has given me much thought during the past few years, I have decided to present my conclusions to the members of the institute for their consideration. Those who have had the opportunity of exploring the region mentioned above, will readily recall to mind numerous localities to which their attention was directed by would-be miners as "rich and desirable properties," in which there were but few quartz seams running in every direction through fine-grained talcose slate. Most of the gold in such formations was always found disseminated through the slate, and but a small percentage contained in the quartz. Such are the deposits I propose to discuss in this paper.

Of course there are many excellent quartz mines in the South that are paying the owners good profits, and many more to my knowledge that are not being worked for obvious reasons. But it is out of the question to suppose that these slate deposits can be practically worked by the same methods adopted for extracting the ore from well-defined and prominent quartz veins. It is true that in many instances these slate formations are quite rich in gold, but this is not uniformly the case, and as there is no chance of sorting the ore, handling so much crude and dead stuff in the ordinary way of mining and milling would be ruinous.

It has been my privilege to examine quite a large number of these formations in the South, and, as a general thing, they were found so thoroughly decomposed as to render it not at all difficult to spade the slates, and pulverize the whole mass between the fingers. These formations are sometimes several hundred feet in width, extending to unknown depth, and varying in length from a few hundred feet to several miles. In fact, in every respect, except as to composition and location, they bear a striking resemblance to the ordinary gravel deposit.

Now, why cannot these slate formations be worked by water, somewhat in the same way as ore is concentrated in gravel beds? This plan has, in part, been adopted by N. H. Hand & Co., in working a property located near the Pigeon Roost region, Lumpkin county, Ga. The idea seems to have suggested itself to these enterprising men from the surrounding circumstances. It is well known that for a number of years this company have been supplying their mines with water from a well-constructed ditch over 26 miles in length, and by means of this ready agent they have successfully worked the slate vein mentioned above. Before N. H. Hand & Co. took possession, the property was very thoroughly tasted by the old plan of driving shafts and extracting the ore by means of picks and shovels. Very expensive and elaborate machinery was employed, but without success, and the property was eventually abandoned with considerable loss to the company. When the present owners, therefore, took possession, the past history of the mine contained but little to encourage them in this prosecution of the enterprise. There was no regularly defined vein of quartz, but simply a large mass of fine-grained talcose slate, throughout the length and breadth of which good pannings of gold were obtained. A 25-stamp battery, run by water, was erected one-half mile from the mine, at the lowest point accessible. On a high hill in the neighborhood of this mine a large reservoir was supplied with water from the ditch mentioned above, and by means of a "little giant," in connection with this reservoir, playing under a pressure of 150 ft. head, the vein of decomposed slate and quartz was driven through rifle boxes towards the mill.

The inclination of these boxes was sufficient to carry everything in the nature of ore into the mill-house, and the force of the water being broken there by mechanical means, only the finely pulverized slate and floating mud were permitted to pass away and settle wherever opportunities were presented in the various gulches. It was of course necessary at times to break up by means of hammers, or otherwise, any large boulders that were washed down from the vein before permitting them to enter the rifle boxes. But these were of such rare occurrence that two to four men were all that were necessary to supply the mill with ore. The net profits yielded by this mine per week in 1879, under the above treatment, were \$300.

The unused water power of the Southern gold belt is immense, and if companies could be formed to build the proper water ditches to reach these present worthless properties, there would be a wonderful revolution and revival in the mining interests.

From the geological reports of Georgia I find that there are 180 prominent streams in the gold belt of that State, that furnish in the aggregate 26,000 cubic ft. of water per second, the capacity of each stream varying from 2 cubic ft. upward as high as 3,000 cubic ft. per second. This amount of water would give, with an assumed head of 100 ft., 285,640 theoretical horse-power, or 190,426 available horse-power. Again, 26,000 cubic ft. per second would be equivalent to 1,560,000 cubic ft. per minute, and this volume of water confined in a

ditch would supply about 700,000 miners' inches. North Carolina and Alabama are not behind Georgia in the supply of water, and the most of this vast power is running unused to this sea. Prof. Kerr, State Geologist of North Carolina, has given in his report a full and interesting description of the valuable streams of his State, and in some instances gives the estimated water powers. It would be interesting to read this report in connection with this article.

Custom mills should be built at intervals throughout the region, and this water utilized for not only washing down and concentrating the ore, but also transporting it, if possible, to the mill ready for crushing and amalgamating. Upon actual experiment in Georgia, it has been found that by such treatment ore can be profitably handled that yields but 75 cents per ton. Last year the manager of the Findlay informed me that where the ore could be reached by the water, he had succeeded in mining and crushing at a cost of but 28 cents per ton. This was the case, however, where the water was made not only the mining but the transporting agent as well.

The climate is delightful the year round, and seldom are the streams so locked up with ice as to suspend all mining operations. Railroads are running within a few miles of the farthest point of the mining region. Provisions are cheap, and in great abundance. Labor is to be had in sufficient amount, ranging in value from 50 cents per day for ordinary hands to \$1.50 per day for mechanics. The forests are also in their original beauty and abundance, and there is, of course, no lack of wood for building and fuel purposes. So, in summing up, it would not be far from right to assert that, with all these advantages, the same class of ore that is now cast aside as worthless on the Rocky mountain slopes, could be profitably worked in North Carolina, Georgia and Alabama.

## Note on a Direct Process for Treating Fine Iron Ores.

[Read by W. E. C. EUSTICE before the American Institute of Mining Engineers, Subject to Revision.]

This may not be entitled to the credit, or discredit, of being a direct process; still as nothing but iron is reduced to the metallic state, I think it may be called direct.

Interesting experiments have been carried out with the following process at the copper smelting works of the Orford Nickel and Copper Co., Capelton, P. Q., Canada:

1st. The fine iron ore is mixed with a sufficient proportion of fine coking coal, and is coked in any of the ordinary methods for making coke. The effect of this is to convert the iron oxide into sponges in such a shape that the usual trouble of oxidation is avoided.

2d. The resulting mixture of coke and sponges is melted down in an ordinary cupola, the coke furnishing more than sufficient fuel for that purpose.

I may briefly point out here that in the first place the iron is sponged, and this, as is well known, contains no phosphorus or silicon when the reduction takes place at a low temperature; and in the second place, this sponge is melted down in a cupola in which there is no zone of reduction for phosphorus or silicon, and that consequently the resulting iron should be free from both of these impurities.

3d. The liquid sponges, now carburized, is run into an open-hearth furnace, where the requisites degree of hardness or softness is obtained by adding some of the fine ore, and the usual dose of ferromanganese.

I have merely given above this rough outline of the process, but it is my intention, as early as possible, to bring the process more fully before the Institute.

SMELTING ORES.—Many persons, with a thorough knowledge of mines and mining prefer a mine whose ores are of such character that the greater percentage of the valuable minerals which they contain can be obtained by smelting. To all such the Candelaria True Process can say that the State Line mining district is the place for them to seek for such mines. This district joins Columbus district on the south and extends from its southerly boundary to the line of California, hence its name. It was organized in 1874, and though but little work has been done on the mines, that little shows large deposits of valuable ore, which is pronounced as the very best for smelting purposes, containing all the natural fluxes. William Groezinger, of Columbus, has some locations in the State Line district, from which considerable good ore has been extracted. He says there is plenty of wood and water and the ledges are high and strong. Such specimens as are in his possession at Columbus are principally of cube galena and are as perfect and well-cut cubes as though artificially made. At the lower end of Fish Lake valley is also found large quantities of smelting ore which with the advent of the railroad will certainly be very valuable.

A MOUNTAIN OF MARBLE.—It is reported that the marble mountain down in Table Mountain District has been located, and that the quality of the marble is not excelled in the United States. It is said to be worth \$3 per cubic foot in San Francisco. If such is the fact, the quarries will be worth as much as a rich silver mine, as the supply is inexhaustible. Old prospectors have known of the existence of this marble mountain for years; but, as they were looking for silver mines, they did not consider it of sufficient value to bother with it.—Silver State.



## Plants Worth Trying in California.

[The following is the second branch of the report on plants worth trying in California, (based upon Baron Von Mueller's select plants) made to the State Horticultural Society, at the May meeting, by H. Bohr and W. G. Klee.]

**Cassia acutifolia**—The leaflets of this species furnish part of the Alexandria Senna. It is a perennial plant, much of the same habit as the Maryland Senna, and might easily be protected from frost if not quite hardy. *Cassia fistulosa* is perhaps a hardier species. It is the pods of this that are utilized; besides its usefulness, it would be another very ornamental tree added to our gardens.

**Cinchona Calisaya**—The source of the yellow or Calisaya bark, and also of part of the Crown bark, is found in Peru, New Granada and Bolivia at an altitude of 5,000 to 6,000 ft. The tree attains a height of 40 ft. There appear to be many varieties of this species; a Santa Fe variety ascends to 10,000 ft. elevation. *C. Calisaya* has been and is being tried yet at the experimental gardens of Berkeley. Specimens which escaped the early November frosts at as low a temperature as 28° F. were killed afterward by this moist cold which never was actually as cold by measurement as previously. Seeds of these were from Indian plantations where this species thrives, but it would be very desirable to obtain the hardier varieties, as, for instance, the Santa Fe variety. Vilmorin-Andrieux, of Paris, has seeds for sale of various cinchonas, among them Calisaya, var. *anglica*, which is supposed to be from India, and Calisaya, var. *Javanica*. The price is very reasonable, 6 francs for 10 grammes of good seed.

**Cinchona nitida**—The source of the grey or Huancabo bark, is one of the largest growing of the Peruvian bark trees, reaching under favorable circumstances the height of 80 ft., judging from the locality (high elevation of the Andes in Peru and Ecuador). Von Mueller thinks this species one of the hardiest; we are not aware of this species having been tried in California.

**Cinchona officinalis**—Andes of Peru, and New Granada, at an elevation from 600 to 10,000 ft.; yields the Crown or Brown Peru bark, besides part of Loxa bark. This species is averse to a superabundance of moisture, and among its several varieties there will probably be found the hardiest of all cinchonas, the *Crispilla* variety; it is said to endure an occasional frost as low as 27°. The *Officinalis*, and what perhaps is the same, *Condaminea*, have both been grown from seeds in Berkeley. Like the Calisaya, they resisted the early frost of November and lived through the winter by a slight protection, but a decay of the stem set in late in the spring after they had commenced to start which they never recovered from.

The *Cinchona lancifolia*, by Weddell—Considered a variety of *Officinalis*, grows in places where the mean annual temperature is that of Rome, with, however, less extremes of heat and cold. Seeds of *lancifolia* may also be obtained of Vilmorin-Andrieux, in Paris. Seeds from this source are now sprouting at propagation houses of the experimental grounds in Berkeley.

**Cinchona pitayensis**—Is another variety that in upper India has brought some of the best results. It is a tree 60 ft. high. Still another kind, *Cinchona Hasskarliana*, may perhaps belong under *Officinalis*, though the seeds are very much smaller—at least such is the case with samples of this kind procured from Vilmorin. This species has in Java proved very valuable, and deserves like the rest a thorough trial.

**Cinchona succirubra**—From the Middle Andine region of Peru and Ecuador, is a tree attaining a height of 40 ft.; the source of red Peruvian bark. This species has in Berkeley borne out its reputation of being one of the hardiest of bark trees, being the only one of four species that has successfully survived the winter by a very slight protection, and it will probably be this kind that will be found to be the most paying here, as it seems to have been in other countries.

**Camphora officinarum**, or *Cinnamomum camphora*, Lauraceae—The camphor laurel of China and Japan is one of the most beautiful of evergreens, the varied colored hue of the foliage from purple to light green contrasting finely with yellowish branches. Apart from that it may become of great value as the source of camphor. It should be planted in the garden, park and promenades as a shade tree of peculiar beauty. It will most probably be found to be perfectly hardy in all the valleys of California, as it has been tried with success in various parts of the State. In Berkeley it has proved a fast grower; and the young foliage would seem even to be untouched by severe frosts. It is on the whole a tree that cannot be recommended too highly.

**Colubium officinale**—In the northern part of this State, where moist meadows occur, this pretty perennial herb would flourish, and might be sold with profit to the drugstores.

**Ilex Paraguensis**—The Paraguay tea, or mate. The leaves of this bush, which is a holly, are used as a tea by millions of people in Uruguay, Paraguay, and many other countries throughout South America. Though it perhaps never would find much favor with people accustomed to tea, it deserves cultivation trial, as the source of a highly stimulating product. Its nativity places it among the doubtful plants as regards hardiness.

**Forma galbaniflora**—Another umbelliferous plant to be recommended for mountainous regions. It is a perennial, yielding the gum resin galbaunum.

## USEFUL INFORMATION.

## Don'ts for the Varnish Room.

The *Coach Painter* comprises a large store of valuable advice in the following brief article:

Don't use the bucket for a washbasin, or the "shammy" for a towel.

Don't touch your work with sweaty hands.

Don't flood your floor with water; have it clean and dry every time.

Don't wash off your work in the same room you finish it in.

Don't fail to use plenty of clear, soft water in washing off, for if the work won't stand a thorough washing, you understand why, and will not look for a lasting job.

Don't apply your finishing coat, or any other, until you have completely cleaned your work, and are sure it is perfectly hard and free from moisture.

Don't let the pumice in corners, and around and under the moldings, escape your notice.

Don't apply a cold varnish on a warm job, or a warm varnish on a cold one.

Don't keep your varnish in a damp or cold place.

Don't overload your work by laying two coats in one. A full coat laid on evenly is all-sufficient, and will give you a finer looking and more durable job.

Don't work your varnish too long, or leave it too soon. Become acquainted with it and it will obey you first and last.

Don't say you haven't got a good, dry, tight, clean, clear, high-studded and well-ventilated varnish room—*don't*.

Don't pour your varnish back into the can taken from; it will cause you trouble. Have a clean can for the purpose, and use it only after time is given to settle.

Don't keep your brushes in oil or turpentine; keep them in the varnish you use them for.

Don't use any but the best rubbing varnish (it is the cheapest in the end), and follow it with the best finishing.

Don't you know that a job turned out with a fine finishing varnish over a poor rubbing—although it may please you for the time being—will soon return to you for repainting and re-varnishing?

Don't attempt to be a varnish maker by diluting your stock with oil or turps; don't meddle with it, but, if unsatisfactory, send it back to the maker, explaining the trouble.

Don't always lay the blame of a bad job on varnish, brushes, weather, and many other things; but look at home—*once*.

**FINE LUBRICATING OIL.**—Put fine olive oil in a bottle with scrapings of lead and expose it to the sun for a few weeks. Pour off the clear oil for use. Another method is to freeze fine olive oil, strain out the liquid portion and preserve for use. Another good lubricating oil, especially for clock and other delicate machinery is made as follows: Take olive oil and dissolve it in boiling alcohol, and add it drop by drop until it is no longer taken into solution. Upon cooling it will let fall crystals and leave a considerable portion still fluid. The fluid part is to be poured off, filtered through a piece of white blotting paper, and may be used in this form, or the alcohol may be distilled off for fresh processes, and the pure lubricating oil which remains is very suitable for oiling watches, clocks or other delicate machinery. This will not oxidize or gum up, even when exposed to great cold. Or take neatfoot oil and drop it into some lead shavings, in order to neutralize the acid contained in the oil. Let it stand for a considerable time, the longer the better. Oil thus prepared never corrodes or thickens.

**CURE FOR WARTS.**—A correspondent of the *Scientific American* writes as follows: Some years since a corn doctor advised me to use coal oil. My hands were covered with them. Having little faith I tried it, putting a drop on each of common kerosene and letting it absorb; where there was a hard crust, scraping it to facilitate absorption. In a fortnight after twice daily treating them, they began to lessen, and finally disappeared without scar. Then the right hand, in part, leaving one which remained after all others had passed away, and then that one. Have advised others to try it, with like effect on persistent use. Simply softened the top, dropped the oil on, and let it be for some minutes to absorb.

**THE LARGEST STEEL CASTING.**—Messrs. W. Jessup & Sons, of Sheffield, lately made the largest crucible steel casting of which we have any record. It was a spur rim 23 ft. in diameter, machine molded, and was cast whole. The total weight of the casting was 10 tons. The rim is intended for the cotton mill of Mr. Smallpage, Barnley. The steel wheels are expected to pioneer a new branch of industry in the Sheffield trades.

A DIAMOND EXPERT, of Chicago, asserts that many of the so-called solitaires, sold as single stones, are made up of small stones cleverly put together. Under the blowpipe they separate. He adds the surprising statement that not one diamond in ten, sold in this country, is other than the refuse London market. Nearly all are off-colored, specked or feathered, and are sold at a fictitious value.

## Oilstone and Oilstone Powder.

The Turkey oilstone can hardly be considered as a home slate, having nothing of a lamellar or schistose appearance. As a whetstone it surpasses every other known substance, and possesses, in an eminent degree, the property of abraded the hardest steel, and is, at the same time, of so compact and close a nature as to resist the pressure necessary for sharpening a graver or other small instrument of that description. Little more is known of its natural history than that it is found in the interior of Asia Minor, and brought down to Smyrna for sale. The white and black varieties of Turkey oilstone differ but little in their general characters; the black is, however, somewhat harder, and is imported in larger pieces than the white.

Fragments of oilstone, when pulverized, sifted and washed, are much in request by mechanics. This abrasive is generally preferred for grinding together those fittings of mathematical instruments and machinery, which are made wholly or in part of brass or gun metal, for oilstone, being softer and more pulverulent than emery, is less liable to become embossed in the metal than emery, which latter is then apt continually to grind, and ultimately to damage the accuracy of the fittings of brass works. In modern practice it is usual, however, as far as possible, to discard the grinding together of surfaces, with the view of producing accuracy of form, or precision of contact.

Oilstone powder is preferred to pumice-stone powder for polishing superior brass works, and it is also used by the watch-maker on rubbers of pewter in polishing steel.—*Workshop Companion*.

## GOOD HEALTH.

## Treatment of Carbuncle by Carbolic Acid.

In the *Toledo Medical and Surgical Journal*, December, 1880, Dr. J. T. Woods writes:

It is now about two and a half years since a patient presented with two carbuncles, one on the back of the head, the other below it, on the neck. They were of moderate size only, the upper one open in three places, while in the lowest the skin was unbroken.

Having considered the various known properties of the carbolic acid, I determined to use it vigorously instead of inserting it in meager quantity. I loaded my hypodermic syringe, and passing the point through the openings and into the sloughing mass in every direction, I completely saturated it with the pure acid and awaited results. In a minute the smarting disappeared, and with it all pain and all sense of soreness.

By this result emboldened, I again charged my instrument, and thrusting it through the skin over the other carbuncle, in a variety of places, I soaked the whole carbunculous mass beneath the skin, enough of necessity escaping to fully bathe the borders, modify inflammation and destroy any septic elements then developed. I waited, not without concern, and was delighted to learn in a few moments that all the pain and soreness was gone in this also. The skin over the mass became quickly white, hard and dead, and in a few days detached, in the form of a slough, the interior mass also becoming rapidly loosened, only requiring the cutting of a few shreds to remove it, when the cavity was found to present a satisfactory appearance and rapidly filled up, leaving an exceedingly small cicatrice. The remarkable feature in this case was that after the complete saturation of the carbunculous mass no pain occurred, my patient going about his ordinary labor without discomfort. It is now one year since I treated a very painful case, the same method bringing about similar results, the party suffering no pain or even soreness after the lapse of one minute following the injection.

I would advise the use of the pure acid only, and to complete saturation. Dilution would increase, if not create, danger of absorption of the acid, converting a very simple procedure into a condition of great danger, and insufficient quantity defeat the purpose for which it is used.

**TRICHINOSIS.**—According to a recent report to the Sanitary Committee of Massachusetts, it appears that of 2,701 pigs examined during five months, no less than 154, or nearly 6%, contained trichinae. The animals came from different and distant regions, but the majority were from the Western States. The same report affirms that rats are affected with trichinosis at Boston to a much larger extent than in Germany. Of 51 rats caught in a Boston slaughter-house, 30 presented trichinae. On the other hand, 23 fowls fed in the establishment were found to be healthy. Forty rats taken in another large slaughter-house all contained trichinae, but of 60 found in different stables only six were thus affected. In France little consideration has, until lately, been given to the danger of trichinosis in imported pork. At Lyons, however, inspection has been commenced, and has quickly borne fruit. An enormous consignment of lard, amounting, it is said, to 120 tons, was lately received at Lyons from New York. Of 50 specimens examined immediately after arrival, three were found to be infested with trichinae. At Barcelona six cases of death from trichinosis have occurred in three months.

## Cancer.

Many persons undergo a good deal of mental suffering from the want of knowledge of one important fact in relation to this dreadful disease. It is this: When cancer commences, its march is steadily onward toward death, unless arrested; therefore any sore or tumor, however suspicious in appearance, which gets better, or which can be arrested by simple remedies, so that it improves or heals, is not cancer.

I do not say that such sores may not eventually become cancerous, where a tendency to the disease exists, and their liability to do so would probably be a little greater, as disease usually attacks the weaker points; but I do say that a sore that shows marked improvement from its worst condition should cause but little uneasiness or worry. It seems very difficult to determine with anything like certainty whether cancer is, or is not, an hereditary disease. Physicians are divided in opinion, just as they are in regard to the nature of the disease.

I have seen very many cases, and in all stages of development; and I am inclined to believe that the tendency to cancer is inherited—not that the disease exists as a blood poison, but that certain particles or nuclei exist by inheritance, which are liable under certain conditions to develop into cancer. I believe, moreover, that the prospect of eradicating the disease depends on its location, and upon the promptness with which the proper remedies are employed. If deep-seated, they had better be left to themselves, and efforts made to keep up the general health. If superficial, it is possible to destroy them effectually, in many cases, because they exist at first as local affections, the blood remaining for some time uncontaminated.

There resides in New York to-day, a physician, who twenty years ago lost the entire under lip by cancer. He says he arrested the disease by applying tannin to the sore every day and, on the day following, standing in front of a looking-glass, he could see small black spots in the sore; these were the upper extremities of the roots of the tumor, and, seizing them with a small pair of forceps, he would draw them out. He extracted very many in this way; in fact, all that existed. Many of these had preserved between plates of glass and showed them to me. They were from one to two inches long, and resembled the rootlets of a plant. In *Hall's Journal of Health* for December, 1877, I gave the history of a case of undoubted cancer that was cured by electricity. The patient was a most intimate friend, and my anxiety was great, for not a symptom was wanting on which to rest a doubt as to the true nature of the disease; it had extended rapidly to the ulcerative period, and seemed to me an almost hopeless case. My associate physician took a different view of the case, and it proved to be the correct one.

His theory was that cancer was at first a local affection, an independent and forcible body, and that the system does not become contaminated until ulceration has extended far enough for the matter to be absorbed into the system; that strong currents of electricity passed through the tumor would kill it, and that in a few days it would shrivel up and become detached from its seat, leaving the wound in a healthy condition. Such proved to be the case. In five weeks from the first application of electricity no sign was to be seen that any sore had ever existed, and the patient has been in the enjoyment of his usual good health ever since.—*Cor. Hall's Journal of Health*.

## Important to Bread Eaters.

The *London Court Journal* states that the letter to which the following article, from the *Huddersfield Journal*, refers, caused every bakery in London to be besieged: "We last week published a letter from 'Chemist,' on the advisability of the more general consumption of 'wheat-meal' bread. The question is one of great importance, and demands serious consideration. Wheat-meal bread is made from grain which has been deprived of only the outer covering, that is to say, the flour contains the bran. The bread thus produced is not only much cheaper than the ordinary white bread, but it is much better. A shilling's worth contains three times more flesh-giving material, 70 times more heat-producing material, and three times more bone-forming material than is to be found in a shilling's worth of beefsteak. For the discoveries in this respect we are indebted to the late Baron Leibig, who has done more than anybody else to show the world the secret of economical and wholesome cooking. Of course, it is not proposed that the highly nutritious wheat-meal bread should be man's only food. In Spain, it is true, the peasant lives and flourishes on wheat-meal bread and garlic, but the British working man would be very loth to go without the roast beef of old England. There can be no reason, however, why wheat-meal bread should not be substituted for ordinary white bread. By its nutritive qualities men would need less quantities of other victuals, and thus an appreciable saving of money would be the result, while (in growing children especially) the bones, sinews and muscles would be strengthened, and thick coats of pure enamel would preserve the teeth from decay. The only obstacle in the way of the adoption of wheat-meal bread is prejudice."





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SAN FRANCISCO:

Saturday Morning, June 4, 1881.

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## Passing Events.

While the prices of stocks have been pretty well up, there has been no special occasion for it as far as any change in the mining situation is concerned. The breakage of the big pump on the Comstock last week was a discouraging event, which it was supposed would "settle" the stock market for some little time; but it is evidently considered that the situation is very bad.

News from up in the Alaska region, lately to hand, is to the effect that reports, though a little exaggerated, have not been very much out of the way. Some people think the best way to prospect up there is by means of a steam launch. There is plenty of internal water communication in Alaska, so it is easy to go from one place to another. But the underbrush and timber obstructs walking. It is easier therefore to go from place to place by water and prospect wherever open ground is found.

The hills are now covered with prospectors in every direction. The season is fully opened everywhere, and miners who have been idle during the winter are now tramping over the hills hunting "prospects."

The "copper boom," of which we have written of late, still continues. Copper properties are now valuable everywhere. We shall very shortly give a description and engraving of the form of furnace most in use on this coast for copper smelting.

LEAD.—Last week 9,787 centals of lead were received in this city. Since January 1st, 18,579 centals of base bullion have been received in this city, and 33,839 centals of lead. Pig lead is worth 4½ and 5 cents.

PROSPECTORS are beginning to work in Idaho and Montana.

A LARGE deposit of garnets has been found near Calpella, Mendocino county.

## Color of Minerals.

The color of a substance depends upon its power of absorbing certain portions of the light; that is, certain rays of the spectrum; a yellow mineral, for instance, absorbs all the rays of the spectrum with the exception of the yellow. In general the color which the eyes perceive is the result of the mixture of those rays which are not absorbed. All minerals may be divided into two classes, according to Dana. 1st, those whose color is essential and belongs to the finest particles mechanically made; 2d, those whose color is non-essential and in the fine powder is different from what it is in the mass.

It is obvious from these distinctions, continues Dana, that the color of the powder or the streak, as it is called, is often a very important quality in distinguishing minerals. The streak is obtained by scratching the surface of the mineral with a knife or file, or still better, if not too hard, by rubbing it on an unpolished porcelain surface.

To the first class mentioned belong the metals and many metallic minerals; for instance, the streak of the black manganese oxides is black; that of hematite, which is red by transmitted light, is red, and so on. To the second class belong the silicates, and, in fact, the large part of all minerals. With them the color is often unessential, being generally due to small admixtures of some metallic oxide, to some carbon compound, or some foreign substance in a finely divided state. Most of these have a white or light-colored streak. For example, the streak of black, green, red and blue tourmaline varies little from white.

Iridesence is the presentation of prismatic colors in the interior of a crystal. The phenomenon of the play of colors, iridesence, etc., are sometimes to be explained by the presence of minute foreign crystals, in parallel positions; more generally, however, they are caused by the presence of fine cleavage, lamellae, in the light reflected from which interference takes place, analogous to the well-known Newton's rings.

## Miners and Mine Products.

Summaries of the statistical portions of the reports of Her Majesty's Inspector of Mines, show that in 1878 there were employed in the coal mines of Great Britain and Ireland 475,329 persons, of which number 382,929 were miners underground, and 92,350 were employed on the surface. The *Berg und Huttenmaennische Zeitung*, which summarizes the figures, says the underground hands were composed of:

474 boys from 10 to 12 years of age.  
 6,798 boys from 12 to 13 years of age.  
 38,669 boys from 13 to 16 years of age.  
 338,143 men over 16 years of age.

The surface hands are segregated as follows:

752 boys from 10 to 13 years of age.  
 521 girls from 10 to 16 years of age.  
 6,873 boys from 13 to 16 years of age.  
 438 girls from 13 to 16 years of age.  
 4,502 women 16 years of age and upwards.  
 19,769 men 16 years of age and upwards.

These figures show what a large number of persons there are directly interested in the actual mining work of getting the coal.

It is, however, more interesting to note what these employees produced. During the year when these 475,329 people were at work the output of the mines was as follows: 132,612,063 tons of stone coal; 10,747,227 tons of iron ore; 1,625,586 tons of fire-clay; 813,262 tons of coal shale and enclosing pyrites and building stone; 25 tons of petroleum from Derbyshire.

This was not all, however, for the figures given were only for coal, iron, etc. The statistics to give the range of the whole subject, must include more than this. In the extraction and handling of metals and metallic ores and other useful minerals. There were employed underground:

81 boys from 12 to 13 years.  
 824 boys from 13 to 16 years.  
 29,609 men over 16 years and upwards.

Surface hands were as follows:

627 boys and 96 girls 8 to 13 years.  
 4,339 boys and 981 girls 13 to 18 years.  
 1,741 women and 13,060 men 18 years and upwards.

The product obtained with this labor was as follows: Gold, 702 ozs., 16 dwt., 8 grs.; gold ore, 2 qrs., 26½ lbs.; silver, 153 ozs.; silver ore, 86 tons; cement silver, 8 cwt., 2 qrs.; copper ore, 54,568 tons; cement copper, 532 tons; coal ore, 98 tons; tin ore, dressed, 13,632 tons; tin ore not thoroughly dressed, 950 tons; tin ore, raw, 9,847 tons; uranium ore, 8 cwt.; zinc ore, 24,682 tons; manganese ore, 1,734 tons; arsenic, 4,464 tons; arsenical pyrites, 3,638 tons; ochre, 2,805 tons; rock salt, 182,930 tons; salt, (extracted from water), 1,500,000 tons; iron ore, 2,559,333 tons; pyrites, 14,759 tons; barytes, 21,715 tons. There were, also, quantities of building stone, cement, paving stones, lime stone, gypsum, etc., etc.

These condensed statements show what a very large product the mines of Great Britain give; and how many men, women and children contribute their labor in this direction.

The annual report of the Jocinstita mining company shows a cash balance on hand of \$277,035.29, being the net profit of operation from August 2, 1880, to March 1, 1881. The property of the company is at St. Ignacio, State of Sinaloa, Mexico.

## Taking up Coal Lands.

People who have tried it find that to acquire legal title to coal lands is considerable trouble. For instance, timber lands containing coal are not subject to sale. If an association takes up coal land each one must be 21 years old and a citizen of the United States. Coal lands are, of course, excluded, as mines, from pre-emption. But the great trouble is that you cannot acquire title until the land is surveyed. In the new fields of Arizona, New Mexico, Alaska, etc., a man cannot now acquire legal title by reason of the land not being surveyed. No land can be entered under the provisions of the coal act, until the same has been surveyed, the coal act declaring in the first section of it, "That any person, etc., shall have the right to enter by legal subdivisions." Of course, there can be no legal subdivisions on the unsurveyed public domain.

A correspondent of the Salt Lake Tribune, who has hunted this matter up in Washington, says, that in this dilemma the General Land Office has been asked many times to point out some way of acquiring title so as to protect the discoverer of coal under these circumstances. But the Commissioner steadily refuses to give advice upon the subject because methods that would be effectual in one community would not be so in another. He tells all, however, the same old story that no steps can be taken to secure title from the Government until the township plat is on file in the local Land Office, and that should a conflict arise as to the right to make the entry, priority of possession and improvements would govern.

With 60 or more thousands of emigrants coming into the country each month, and a majority of these going into the wilderness, as it were, it does seem as though Congress should provide some means of completing the survey of all public lands at an early date. But Congressmen, as a rule, do not have much foresight.

In reply to a recent inquiry, the Commissioner of the General Land Office says: "I will not undertake to say what is the precise degree of value necessary to bring coal lands under the operation of the coal act. The fact of the land being mined and coal being taken out, would be sufficient to determine the character of the land and to exempt it from the operation of the homestead law. Whether the coal is of an inferior or a superior quality, it is still coal, and subject to disposition under the coal act."

## A Smelting Oven.

R. P. Wilson, of New York, has devised what he calls a smelting oven, the object of which is to provide a system of treating ores and minerals, whereby the impurities which now enter into smelted iron or base bullion of the precious metals cannot enter and mix with the same, thereby causing said metals to be produced in a pure state, direct from the ores.

The invention consists in the arrangement and construction of a series of upright retorts, set in an inclosed furnace, so that the heat in the furnace will pass around and below the outside of the retorte and heat them to any degree required for the treatment or smelting of the various ores.

The retorts are constructed with one or two openings or branches near the lower end, for the purpose of withdrawing the mineral or slag. They are also made with an opening or branch near the upper end of the retorts, for the exit of gases into a pipe leading to the condensing chamber.

The idea of this inventor appears to be that, inasmuch as mixing ore and fuel together tends to cause impurities to be incorporated with the base metal, requiring subsequent treatment of an expensive character to purify the metals, he will keep the fuel separate from the ore by melting the latter in retorts. It does not seem, however, as the system shown would be very practical on a scale which would be necessary around large works.

## Mill Sites.

Mill sites may be located under the provisions of the mining act, and must be recorded. Locators of mining claims have the exclusive right of possession of the surface ground included within the lines of their locations, upon compliance with the laws of the United States, and with the State, Territorial and local regulations governing their possessory titles, where no adverse claim existed before May 10, 1872. But a mill site must be on non-mineral land. The owners of the mill site are entitled to the timber growing thereon.

It is the rule in the General Land Office under Section 2,337, United States Revised Statutes, to require that mill sites shall be located and recorded in the same manner as a vein or lode, and in case of a mill site not held and worked in connection with a lode claim, the customary certificate that \$500 worth of improvements have been placed upon the claim is demanded.

Mill sites can only be five acres, and on no consideration can more be taken up.

## Deep Mines in Idaho.

It is now pretty well conceded that the Wood River country, Challis, Sawtooth, and the other neighboring regions in Idaho, will be very profitable if the mines "go down." This "going down" is a question everywhere. Miners don't believe much in surface deposits. They think the ledges, to pay well, must be better below. Then they are assured of plenty of ore. There is such a very large number of mines in the districts of the regions above alluded to, that if one in a hundred only turn out rich at great depth, they will encourage a great many to put in their best licks in sinking. The "if" about the depth can only be decided by time and experience, but there are some pretty deep mines already. A correspondent, who is now at Wood River, in speaking of the depth of mines, speaks of several which are now pretty well developed. He says:

"In the Sawtooth district we have the Visnna down 600 ft., the Pilgrim nearly 100, the Smiley property 125, and others nearly the same depth, with an improvement in all of them as depth is attained. In Galena district we have the Eunics, the Gladiator, the White Cloud and others down from 75 to 200 ft., with the same result. In Warm Spring district we have the North Star on the East Fork and a number of others on Warm Spring creek, which are developed to a depth of from 50 to 150 ft. In Greenhorn gulch are several which are down from 50 to 185 ft., while around Bellevue the Mayflower, the Jay Gould, the Idahoan and several others have sufficient ore in sight to be admitted by the most fastidious to be very valuable properties. Near Jacobs City and around Bellevue there are numerous ledges that have been tapped at a sufficient depth to require years to work out the ore that has already been exposed. Now, why continue to use that ever-ready 'if'! Besides the mines referred to above, there are hundreds of locations which look well and give promise of being equally as good. Now, suppose one in one hundred of these prospects should be a good mine, and 99 out of 100 should fail to go down, we still have mines enough to make a good country."

## Large Grant of Mineral Lands.

The immense tract of land which has been granted by the Mexican Government to Samuel Brannan, a pioneer resident of California, in return for his assistance with men, money and arms during the invasion of Mexico by France, is a valuable one in minerals. The section is about 250 miles east of the port of Guaymas. It constitutes what has been known for years as the Yaqui country, and is justly regarded as the richest portion of Sonora. Within its confines are some of the fabulously rich silver mines which yielded so much revenue to the Spaniards prior to the earlier portion of this century. It is richly wooded and watered, contains very fine grazing and agricultural lands, and is conceded by those most conversant with the resources of Sonora to be the garden spot of northwestern Mexico.

Mr. Brannan expects to colonize the tract with Californians and Nevadans. He is to give 100 acres of land and a town lot to each one. By concession all goods for immigrants are to be free of duty and no tax or military duty will be called for for 10 years. Mr. Brannan is now in this city.

The *Arizona Journal* says that the land grant consists of 42 square leagues of land, at any point which Mr. Brannan may select in that portion of Sonora which lies between the Yaqui and Mayo rivers. This grant is to be supplemented by an additional 42 square leagues as soon as Mr. Brannan shall have settled up the first portion, making a total of 756 square miles of territory—a good sized principality of itself. To this has been added a franchise to construct a railroad from any point within the grant to any point on any railroad from El Paso to Guaymas that may be selected by Mr. Brannan, the franchise to exist for 99 years.

EDISON'S LIGHT.—One of Edison's electric lights, brought to this coast by Major McLaughlin, and to this city by Mr. Glass, of the Spring Valley hydraulic mine, was exhibited at the American District Telegraph Co.'s office on Wednesday night. The invention consists of a hulons-shaped glass three inches in length and two in diameter, and gradually tapering to the stand upon which it rests. The glass bulb is exhausted. Passing up into the vacuum from the base are two platinum wires, around which the glass has been closely blown, and at the end of each of these wires is a carbon point. From each of these points is a semi-circular piece of carbonized hainho no thicker than a piece of thread. The platinum wires were connected with a chemical battery and the electric current regulated by means of a key similar to those connected with gas fixtures, and, this being opened, a light was produced on the semi-circular piece of carbonized hainho. The light produced was steady, soft and not hurtful to the eye. The inventor claims that the carbon points, if perfect, will last three years.



## Notes of a Trip to Yosemite.

(Written for the PRESS by G. H. S.)

Leaving San Francisco on the Overland train at 3.30 p. m., on upon the Los Angeles and Southern at 4, the tourist makes a pleasant journey of about four and a half hours to Stockton in the cool portion of the day, arriving at the Yosemite house, Stockton, in ample time for dinner. Breakfast in time to take the 8 o'clock train for Milton, 28 miles from Stockton, at which point the coaches of the Big Oak Flat route are ready to receive him. From this point the road, which is very good, enters the hills at once, thus avoiding a hot, dusty ride through the flat valley lands, and winding through the hills, where there is a cool, pleasant breeze, it brings him to Copperopolis in time for dinner. Here are located many copper mines, among them the famous "Union," which formerly employed 300 men for some years, but which is at present shut down. A company is now using the water from the mines, which is strongly impregnated.

This water is hoisted up in tubs from a depth of about 18 ft., and is discharged over ore dumps through which it passes. From these it is led into tubs and sluices in which old scrap iron, sheet tin, etc., is placed. The action of this acidulated water dissolves the iron and when this is effected a clean up is made, and the copper which has been deposited is collected. About six inches of water is run through, and the company pay the owners of the mine one-fifth of the result.

It is said that an English company have offered \$50,000 for this mine and been refused. Taxes have been assessed against it for this valuation the present year, and this may result in its being worked again shortly.

Leaving Copperopolis large cattle ranges are passed, some of them two miles square, while the roadside is dotted at intervals with neat cottages, vineyards, and fruit orchards.

As the road runs deeper into the mountains the scenery becomes more interesting, and the wonderful Table mountain range lies along the road for a number of miles. It is apparently a basaltic formation, having a breadth of from 200 to 500 ft. upon the top, and is almost perfectly level, having sides which are perpendicular down to the slope which falls away from its foot. These perpendicular sides vary in height from 30 to 150 ft., and are a prominent feature of the landscape for many miles. This formation is somewhat broken at its lower end and is cleft entirely across by the Stanislaus river which cuts through it at a point near where the road crosses the river, but after a few miles it becomes a long, level unbroken table extending northward through several counties. The whole of the hills and mountains hereabouts, from some distance below Milton and along the line of the stage road present the appearance of having been subjected to the action of water similar to the beaches and rocks of a sea or lake shore.

The Stanislaus is crossed by a bridge at Burns' Ferry, and over an undulating road the route lies to Chinese Camp, a mining town which was formerly a scene of buoy activity, but has now fallen to decay, and, with its streets of empty and deserted brick, stone and fire-proof buildings, is but a monument of its former greatness.

The third stage of the day's journey commences here, and after leaving we soon come in sight of the Tuolumne river, which is reached by a rapid descent of about 800 ft. We cross Woods' creek, just above its junction with the Tuolumne, and stop in the little town of Jacksonville, formerly containing a large population, but now reduced to a few inhabitants. The principal portion of the town was washed away by a flood several years ago, and has never been rebuilt. From this point there is a beautiful drive of some miles along the banks of the river to the ferry (Haswell's), where we cross by a boat guided by a strong wire cable and driven by the current, which is quite rapid. Another three miles, through old and partially deserted placer diggings, with here and there some work going on, brings us to the foot of the mountain, at the top of which stands the famous

## Priest's Hotel,

Where our day's journey ends. In two miles we ascend 1,400 ft., but the road is good, and indeed, after the first few miles from Milton, but little dust is encountered, as there is no heavy teaming of any consequence upon this road.

We were awakened early this morning, and found a breakfast awaiting us, which still lingers in the memory. Very few of the wayside houses provide so well for the comfort of the traveler as Priest's.

The air is cool and bracing but not sufficiently so for any heavy wraps, and all being seated in the coach we move out over a road which is very smooth and pleasantly undulating for some miles, passing through Big Oak Flat where the gigantic oak, long since overturned, lies close to the road. Garrote and other small places are passed in succession, and as we continue to rise the trees become larger and the forests denser.

Although the altitude seems to us great at Priest's, we are still going up, up, until it seems as if the top will never be reached, but when the summit is finally passed, we rattle down towards the valley at a lively pace. Patches of snow still linger near the road, and in the distance the mountain peaks are covered. After a few miles we reach the grade road which finally leads us

## Into the Valley,

And everybody is now anxious to catch the first glimpse of the wonderful Yosemite. The road is admirably built with immense stones laid up in walls, and winds downward like a Jacob's ladder, so that we see our road almost beneath us for a thousand feet. At all the turns we have a fine view of the Bridal Veil fall, which like all the others is now very full of water. We are more than compensated for our early start this morning by the beautiful prismatic tints formed by the declining sun, and those tints are so blended and confused in

bridge where the trail crosses it forms what is well-named "the Diamond Cascade." Just below this it flows over a smooth but steep incline with a beautiful pulsating movement, forming what is called the "Silver Flume," terminating in the "Emerald Pool," where the water lies in a quiet lake before plunging over the "Vernal Fall."

The route the next morning took us to Glacier Point.

And the Sentinel Domes, which is behind and far above the Sentinel seen from the valley. Starting at 9 o'clock, the usual hour for the different saddle trains to leave, we wind along up this mountain side upon a zigzag trail of much greater width than I had supposed it was possible to build. The trails are all comparatively easy, and are kept in good repair, so that, except for the fatigue of riding all day upon such steep inclines, no one need be deterred from most of the trips.

The saddle trains consist of some sixty animals, mostly horses, gentle and well-broken, and very sure-footed. They need hardly any guidance, being so accustomed to follow each other that one may ride to the very top of any of the trails without touching a rein.

As we ascend the trail the view of the valley becomes gradually more extended and beautiful, until we reach our first resting place, Union Point, from which the hotel directly beneath us looks like a doll's play-house. Close to this point and just below the trail stands the Agassiz column, a peculiar oblong or bottle-shaped rock, standing vertically upon a base about its own diameter, but apparently entirely separate from

down the valley, and to the Cascades, still farther down in the narrow gorges, through which the river makes its final exit from the valley. A short walk from the hotel, across the bridge and the narrow intervening valley, brings us to the foot of the lower falls of the Yosemite, but the volume of water which is now pouring over it, aided by the strong breeze, makes it impossible to approach very near without being completely wet through by the drifting spray.

## A Portable Mining Flume.

A short time since the MINING AND SCIENTIFIC PRESS Patent Agency obtained for James Howe and Nelson Waite, of Shasta, Shasta Co., a patent for an improved method of constructing portable mining flumes, either for the purpose of working new ground or to carry off tailings. It consists essentially of a framework which is so constructed as to support the side boards of a flume without the necessity of any bottom or the use of the bracing usually employed upon flumes. This enables the miner to build the flums by simply setting it on the ground, and when working new ground it will gradually settle down, the earth caving into it and being washed down until the flume has reached the bed-rock, side boards being added as fast as may be necessary. The flums could be built without the necessity and expense of excavating to bed-rock.

Mr. Waite, who is now in San Francisco, says they have been using the flume, and it is a very great improvement for working flat land. When set on the surface, with a little dirt or brush thrown against the outer sides to hold it steady till it settles, it will work itself down. The water begins to excavate at the lower ends of the flume, gradually working back toward the head; and as the flume settles, new side boards are added. Not having any bottom it may be sunk at any point.

The principle of the flume is the same as that of parallel jetties. The water flow is confined between the enclosing sides of the flume, and by being thus confined directs its energy in tearing away the bottom. Thus, it digs a trench for itself. As this trench increases in depth, the side boards of the flume are added, the flume settling down gradually. Length after length may be added, and tailings carried on in this manner to any required distance.

Mr. Waite is of the opinion that this principle may be tried with success on the debris in the river. He thinks that if flumes of this kind were put in at different distances along on the river, so as to straighten the channel and confine the current, the debris could be kept moving in the river to the tule lands and broad flats of Suisun bay. He has devised a plan for this. He puts a row of uprights of iron or wood, backed by a corresponding row, connected by braces. Opposite this is a corresponding double row of uprights. As soon as sides are put in this forms a flume to direct the channel. As the debris is moved from between the "jetties," the sides are pushed down, the channel between thus constantly deepening until by and by the whole water flow concentrates here. This cuts away the bottom very rapidly. The piles or uprights ought to be of iron, Mr. Waite thinks, but the sides may be of plank.

Where the water spreads so every time it turns, it forms a bar; but when confined no bar forms. If the debris is brought into the upper bay and rivers kept clear, while portions of the bay would naturally fill up, a channel would be kept open by the strong tidal currents, aided by those formed by the river flow. There would be then one deep channel. Mr. Waite is very anxious to have a section of these flumes or temporary jetties put in on some of the upper rivers, to prove the correctness of his theory. They want a channel and want no flume with a bottom, which would be too expensive. This would make the water cut its own channel the same as Mr. Eads' jetties, at the mouth of the Mississippi, caused a deepening of the channel there. The principle is the same, the means of carrying it out forming the only difference. This system would, of course, be more economical. Sometimes, Mr. Waite says, the bank of the river could be used for one side, and the jetties for the other. In such cases, half the expense would be saved.

TWENTY-FIVE carloads of the Moulton mill machinery have been shipped from the East since the 1st of May.



CATHEDRAL PEAK GROUP, OF THE HIGH SIERRAS, BEYOND THE YOSEMITE VALLEY.

the mass of mist and spray which is thrown out from the foot of the fall, that it looks like a ruined rainbow. Still continuing the descent, we finally reach the valley, and as we ride along we have a nearer view of the Bridal Veil fall; then upon the opposite side the Ribbon fall, or Virgin's Tears as it is sometimes called, and just beyond, To-tock-ah-nu-lah, or El Capitán. Just beyond this are the "Three Brothers," or as the Indians call them, Pom-pom-paus, (mountains playing leap-frog), and beyond this we catch the first glimpse of the Yosemite upper fall. The Cathedral Spire is passed upon the right, and the "Sentinel," "North Dome," "South Dome," "Royal Arches," "Washington's Tower," "Cloud's Rest," and other points appear in the distance. We soon pass the lower hotel, the little chapel and middle hotel, and continuing our journey for another half mile we finally alight at Barnard's hotel (Formerly Hutchings) at about four o'clock in the afternoon.

This being Mr. Hutchings' original selection is one of the finest locations in the valley. The Merced river flows so closely to the rear porch that one might take a "header" into its clear water, but for the restraining thought that the water is "just off the ice" a few miles above.

The booming roar of the great waterfall is a sufficient lullaby for the tired travelers, and the fresh mountain air seems a wonderful restorative, for this morning found us quite ready for our first excursion, which we made up the valley to the

## Vernal and Nevada Falls,

Stopping at Snow's hotel for lunch. The level road up the valley is easy and picturesque, and after sufficiently admiring the Vernal fall we again mount our horses and commence the ascent of the winding trail to the Nevada fall, which we reach before noon. The streams are all full of water from the melting snows, and the beauty of all the falls is correspondingly increased. From the foot of the Nevada fall the water tumbles down its rocky channel, and at the

it, and so delicately balanced that but little would be required to overthrow it.

Although we are now at an altitude of 2,200 ft., the guide informs us that we are only half way to the top, and we resume our upward journey after a short rest.

Glacier Point is one of the prominent points of observation, and gives one of the finest views in the valley. After lunch at this place we ride to the top of Sentinel Dome, from which most of the great mountains of the Merced group and the Sierras, beyond the South Dome and Cloud's Rest, are visible. Nothing has so grown and impressed me with its grandeur as the great South Dome. Yesterday on the trip to Vernal and Nevada Falls, the great North Dome, Cap of Liberty or Mt. Broderick divided the honors with it, as it did not appear so much larger, as it really is; but to-day as we go up, the other mountains gradually sink into the landscape, while the South Dome seems to rise higher; and when finally we surmount the Sentinel Dome, its rounded, smooth summit still seems hundreds of feet above us.

Before we reach the top of Sentinel Dome we are obliged to cross a body of snow six or eight ft. deep, but solid enough to allow the horses to walk upon it without sinking more than half knee deep. A strong wind was blowing when we reached the summit, and, after a short stay, we again commenced our descent.

The descent is quite as fatiguing as the ascent, but is safely accomplished by everybody, even ladies who have never before been in the saddle, and we arrive at the hotel by half past four in the afternoon.

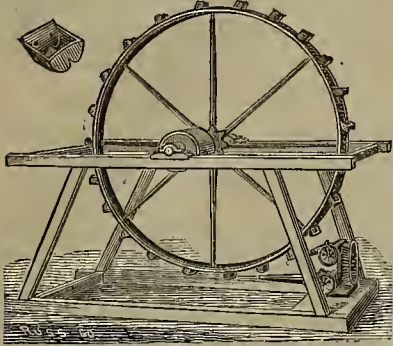
The following three days were spent mostly in the valley. We made an early morning trip to Mirror lake, about three miles above the hotel, to see the wonderful reflection of the surrounding mountains in its dark waters, and the effect of the sunrise through a tree fringed depression in the mountains, after which the surface became suddenly ruffled and it is finished for that day.

Another trip is made to the Bridal Veil falls,



## THE PELTON WATER WHEEL.

(Patented, Oct. 26, 1880.)

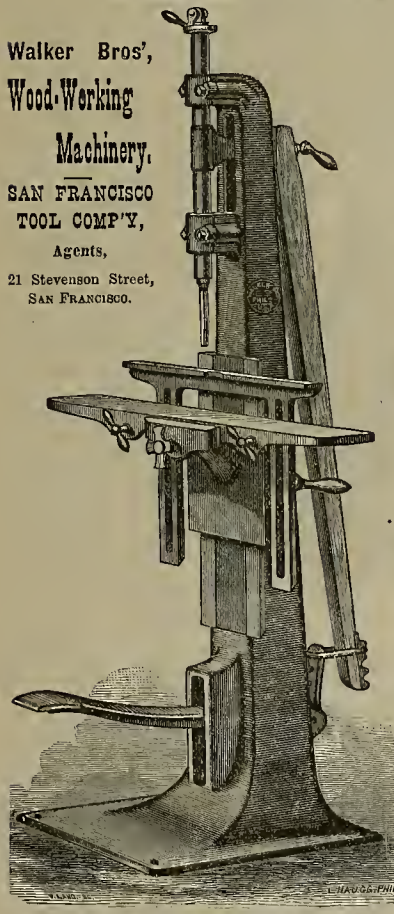


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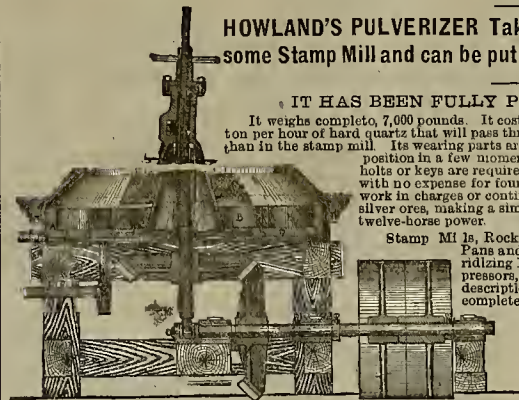
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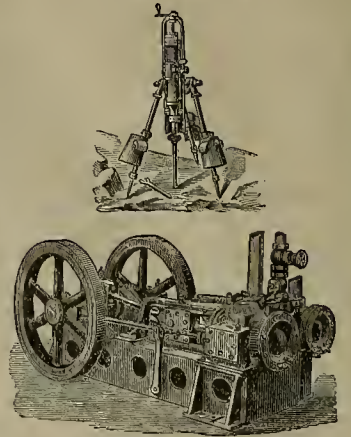
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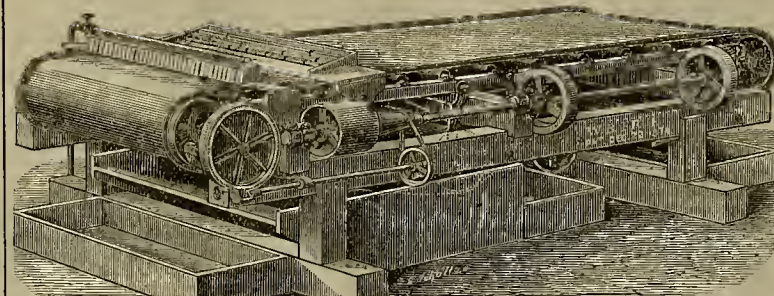
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.)

FOR THE WEEK ENDING MAY 24, 1881.

241,907.—LATHÉ ATTACHMENT.—H. C. Barnes, Vallejo, Cal.  
241,291.—NITRO-GLYCERINE COMPOUNDS.—G. S. Dean, S. F.  
242,094.—HARROW.—T. J. Hubbell, Mayfield, Cal.  
241,883.—RETORT FOR REDUCING ORES CONTAINING VOLATILE METALS.—D. T. Tonnison, San Jose, Cal.  
241,874.—SUSPENDER.—W. F. McFarlane, Ivanpah, Cal.  
241,876.—BLACKING—Geo. W. Miller, Austin, Nevada.  
241,018.—TRACAS BUCKLE.—P. S. Miller, S. F.  
9,723.—CABINET JEWELRY (re-issue).—W. A. L. Miller, S. F.  
242,023.—SHIRT.—D. Neustadter, S. F.  
241,878.—SICKLE BAR FOR HARVESTERS.—V. R. Ostrom, Modesto, Cal.  
241,822.—KITCHEN IMPLEMENTS.—J. W. Ross, Santa Clara, Cal.  
242,057.—DOOR CHECK.—J. J. Schlueter, S. F.  
241,824.—BEER FAUCET.—E. J. Rubottom, Felton, Cal.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of special mention:

**SICKLE BARS FOR HARVESTERS.**—V. R. Ostrom, Modesto, Cal. Dated May 24, 1881. No. 241,878. The improvement in sickle bars is one, the object of which is to prevent the grain from falling off when the front of the header is depressed at an angle to cut low grain. In operating headers, when the front is depressed to cut low grain, the upper surface of the bar has a downward inclination, and there being no obstruction, the grain which falls to be caught by the traveling draper is liable to slip forward again onto the ground. A considerable portion is thus lost. The invention, which is designed to lessen this loss, consists essentially of a finger or sickle bar made of a single iron strip so secured to a beam as to have a vertical side raised above the level of the draper, a wall being thus formed and the grain prevented from slipping forward when the front of the header is depressed to cut low grain.

**CABINET JEWELRY.**—Wm. L. Miller, S. F. Dated, May 24, 1881. (Re-issue). No. 9,723. This invention relates to an improvement in the manufacture of a style of jewelry known as "cabinet," in which the ornamentation consists in filling a cavity in the face of the article with finely divided particles of ore, or other other substances, and covering it with a transparent face. The particles are generally put in from the front and the glass put over them. In doing this the particles cannot be prevented from shifting their position, the friction causing dust to form and settle on the glass. Mr. Miller fixes the glass cover or face in position, and filling the particles into the cavities with a cement or putty over the under side of the compartments, so as to press the front particles snugly against the glass and fix them immovably when the glass is in place.

**BLACKING COMPOUND.**—George E. Miller, Austin, Nev. Dated May 24, 1881. No. 241,876. The object of this invention is to provide a blacking compound for boots, shoes, harness, trunks, carriage tops and other leather articles. Its qualities are durability, susceptibility of high polish, cleanliness, imperviousness to water and snow, protection to leather, harmlessness therein, more capacity for rapid drying. The compound combines all the best effects of a blacking and can be used for ladies' or gentlemen's shoes.

**SHIRTS.**—David Neustadter, S. F. Dated May 24, 1881. No. 242,023. This invention relates to certain improvements in shirts and similar garments. It is a method of strengthening hack openings by facing extending the entire length of said openings. The overlapping strips are stitched to both the edges of the opening and across its lower end, and combined so as to form a finish and re-enforce.

**SUSPENDERS.**—W. A. McFarlane, Ivanpah, San Bernardino county, Cal. Dated May 24, 1881. No. 241,874. The invention consists in providing the ends of suspenders with an elastic band and detachable buckles and holders connected therewith. The object is to provide suspenders, the attachments of which will be serviceable and easily removable.

**NITRO-GLYCERINE.**—Gilbert S. Dean, S. F. Dated May 24, 1881. No. 241,941. The object of this invention is to increase the safety of nitro-glycerine compounds in handling or transportation. It consists essentially in mixing it with a pulverulent nitro-compound and water.

The completion of the Atchison, Topeka and Santa Fe railroad through Sonora, Mexico, will develop important anthracite coal deposits. It is 115 miles from Guaymas. There is exposed five or six ft. of the vein, the foot walls not being in sight.

### Alaska Mines.

Reports from the Takon mines, Alaska, are to the effect that while the earlier reports are exaggerated, the mines will in due time prove rich and permanent. The ledges are all gold bearing, in a slate formation. They vary from two to eight ft. in width, with an easterly dip of 65° and a northwest and southeast trend. The rich boulders said to have been found on the beach were not found at all. The thing was a baseless rumor. Harrisburg, with 80 inhabitants, is 180 miles by water from Sitka, but only 75 miles by a direct line. Another new camp is reported eight miles from Harriburg, and a town called Providence has been started. The ledges are large and gold bearing. A correspondent of the *Chronicle* sums up the situation at Harrisburg as follows:

The mineral belt seems to be about two miles in width, has been explored a distance of about six miles northerly and southerly, and is situated about four miles inland from the coast, at an elevation of from 1,500 to 2,000 ft. above the sea level. But little work has been done as yet on any of the numerous locations. Nearly all the labor thus far has been expended in cutting trails, building houses, and getting ready to mine. The large amount of snow that falls here will be a serious detriment to the speedy development of the mines and a thorough prospecting of the district. I would not recommend this as a poor man's country, nor would I recommend a poor man to come here; he cannot get around with a little money. The prospector cannot even carry his own blankets here. The mountains are very precipitous, and so thickly covered with underbrush as to render it impossible to get far from a trail. It requires at least three Indians to carry blankets, camp equipments, etc., for one prospector. Mr. Indian must be fed and paid. The best and most feasible way to prospect in this country would be with a small steam launch; one that could skirt the shores of the numerous inlets, and search for float ore, and, when it was found, follow it up the mountain to where it originally came from. In that way a party could very thoroughly prospect the whole coast range, and would, no doubt, make some valuable discoveries during a season, especially north of this camp.

### Botany in Southern California.

**EDITORS PRESS.**—Many disappointed mining explorers have turned their attention to agricultural pursuits, but it is more seldom that they become enthusiastic devotees of botanical science, hence a marked example of the latter unusual condition, seems deserving of record.

Parish Bros. S. B. & Wm., occasional contributors to horticultural journals, and still more widely known by the valuable additions they have made, and are still making to choice garden novelties, after an honorable service in the Union army during the war of rebellion, and a subsequent hard experience with the miner's pick and shovel, through the wilds of Utah and Arizona, eventually turned their attention to developing the more substantial agricultural wealth of the rich San Bernardino valley.

Finding a sheltered nook near the banks of the Santa Ana, they gradually supplanted the cottonwoods and willows of the well-watered soil with vineyards and orchards, and in the modest bachelor quarters under the shade of a weeping willow, indulged in few mournful regrets as they saw the wilderness around them begin to blossom with something more than roses. A well-selected scientific library, with a good supply of horticultural publications inside formed a fitting complement to the increasing array of floral charms outside. Not content with the usual commonplace stock of ordinary gardens, they ransacked the neighboring hills and mountain slopes for native plants, and soon around their artesian fountain, pouring a constant stream of delicious coolness, was clustered many a strange denizen of rock, ravine, and desert waste, in strangely contrasted groups.

Here a bed of luscious Humboldt lilies with their brilliant spotted perianth overshadowed the slender forms of the light-yellow Parry lily, with its delicate perfume; trailing over the damp eoli, apparently as much at home as in the deep ravines of Lytle Creek canyon, was the delicate *Palmerella debilis*, with its festoons of bright, lobelia-like flowers, blooming freely in the bright sunlight, and showing its adaptations to cool greenhouse culture. *Pentstemons* of every shade and form were disputing the ground manfully with the more ordinary garden types.

In the drip of the fountain damp, mosses and delicate ferns find a congenial home, and an extemporized tank is appropriated by the rare yellow *Nymphaea* of Florida.

When the hot summer sun gives place to the shortening autumn days, the hospitable board is spread with luscious fruits, in which *Vitis* and *Pomona* are chief rivals, *Citrus* keeping in the back ground.

Through an inviting open door is the Parish Herbarium, the sanctum of the elder brother, Samuel B.; here safely stored in open pigeon holes, scientifically arranged, is the accumulated result of many seasons' work, extensive botanical correspondence, and what will eventually prove the nucleus of a standard collection of the native plants of Southern California.—*C. C. Parry, in Rural Press.*

### The Butte Boom.

Every day that passes makes it clearer that this city is destined soon to become one of the chief mining camps of the world. Here are found the only true fissure veins of silver ore yet discovered in this country, and unless all the signs mislead, the mines opened thus far are only an earnest of better to come, when capital and machinery begin their inevitable work in our midst. Wonders have already been worked with the limited facilities possessed by our miners, and to the faithful and persevering efforts of these plucky pioneers is due the fact that Butte now ranks as the most promising mining center of the United States. To reap the full harvest, however, it is necessary that outside capital shall be brought into the territory.

This most desirable end can be easily accomplished, and it can also be easily defeated. It can be accomplished by simply telling the truth about our mines. The mines and mining prospects of Butte are good enough to go before the world on their merits. There is no need to lie about them or to try to pass them off for better than they are. Let the simple truth be told regarding the quality and quantity of ore in sight and within easy reach in any of the developed mines in this district, and unlimited capital will come forward to earn a rich reward by doing the work required to realize on the raw product.

It shall be our duty in the future, as it has been our pleasure in the past, to give the public the fullest and most reliable information regarding the developments made in the various mines in Butte and the surrounding camps. We believe that by telling the plain, unvarnished truth about our mines, the city will be greatly benefited and the reputation and wealth of the territory will be vastly and rapidly increased. In a few brief months the whistle of the locomotive will reverberate in the mountains lying all about us, and with the railway will come thousands of pilgrims anxious to make their homes in our midst. There is room enough and wealth enough here for all that come with willing hearts and strong hands. Both the railway and the thousands of human beings and millions of capital that will accompany it should be met and welcomed in a liberal spirit by our citizens. Everything that helps to develop the wealth of our mine is a benefit to every thrifty individual in the community, and the business boom now beginning to make itself felt in Butte will soon make a rich metropolis of what five years ago was but a half deserted mining camp.—*Butte (Montana) Miner.*

### What is Arizona Good For?

Many people make a great mistake when they suppose that Arizona is good for nothing except for mining. The agricultural land, it is true, is comparatively small, yet we have enough good land, if we had the right kind of men to take hold and put it into cultivation, to raise all the grain necessary for the needs of the Territory. There are millions of acres of fine grazing lands in Arizona, if we only had water for the stock to drink.

We have no doubt this difficulty will be overcome in time. By sinking wells and opening up water channels in the mountains and foothills, which may be done in almost any of the higher ranges of mountains, plenty of water may be obtained. At comparatively little cost the water so obtained may be conducted to the low lands in pipes and watering troughs placed at convenient distances, and thus reclaim some of the finest grazing lands to be found in the West. Colorado is represented to possess over 300,000 head of cattle, besides thousands of sheep and horses. Arizona, perhaps, does not possess more than a third as many cattle as Colorado, but the day is not far distant when she will lead that State in the number of cattle produced. Arizona possesses many advantages over that State in stock raising. Most of our grasses are perennial; we have no severe cold weather or driving storms, which are so trying to stock; we never have to feed them during the winter season, as they do there; we have a reliable pasturage and will never have to drive stock in search of new feed, as they do in all northern latitudes and California. While we possess the finest silver and copper mines to be found in the world, we should not overlook our agricultural and stock lands, which are by no means limited, as many suppose. As we the case in California in early days, we are apt to overlook these interests in our anxiety to realize quickly from mines, but the time is coming when Arizona will export millions of dollars worth of live stock.—*Arizona Citizen.*

The jury in the case of the Iron Silver mining company vs. the Smuggler mine, Colorado, returned a verdict, Friday, in favor of the defendant.

The Lyon M. and M. Co.'s branch, connecting with the Carson and Colorado railroad is progressing rapidly. A half mile is already graded, and the track laid thereon.

Tombstone and Tucson are to be connected by telephones, which are coming into general use among the mining camps of Arizona.

Every day parties of prospectors leave Tucson, Arizona. Fully 100 prospectors and miners left last week.

### New Mexico.

There is no portion of the United States attracting more attention at this time than Arizona and New Mexico. The latter Territory is destined, at no distant day, to equal, if not eclipse, her sister Territories in magnitude, permanence and richness of her mineral deposits. Besides her mines of precious metals, the coal fields and iron deposits within her limits must eventually prove a permanent source of great wealth. As population increases, manufactures will spring into existence, giving thousands employment, and the great natural advantages of this wonderful section, with the Southern Continental railroad traversing its entire length, with three competing lines reaching her eastern boundary, this population will be secured within a period much shorter than is now supposed by the casual observer. A correspondent thus speaks of this coming country: "The whole mountain range through the Territory is one vast mineral belt. It was mineral wealth which first attracted the rapacious Spaniards in the early part of the sixteenth century, and the reputed treasures of the seven cities of Cibola, as reported by Friar Marcos de Niza, was a moving cause of its first conquest. Old mines have been continually re-opened, which have been buried under the debris of centuries, and American enterprise is daily discovering new ones. The White Oaks excitement of last year and the occupation of Cutillos, are followed by the opening of new districts this winter. Prominent among them are the discoveries made in the Magdalena range, west of Socorro, where great finds, both in silver and gold, are reported daily.

Its plateaus of nutritious grasses, its coal-fields, its deposits, its mine of lead, copper, silver and gold, its capacity for the shipment of wool and hides and cattle, its wondrously watered plains, its average mean temperature of climate, its salubrious and bracing air, its almost Italian sky, its promise as a wine-producing country, and last though not least, its curious remains of an early civilization, combine to give the republic assurance that New Mexico at no distant day will play an important part in the Southwest toward which the energy and enterprise of the land are so visibly gravitating."—*Arizona Journal.*

**ALL THAT GLITTERS IS NOT GOLD.**—As a rule, mining has in the past been attended with too much glitter, haste and superficial knowledge. An assay of a piece of ore found in a prospecting shaft has been time after time heralded through the country as a great strike in a rich mine. With as much reason might the product of a carefully watched garden spot 10 ft. square in the midst of a 160-acre homestead claim be given as the sample crop of a farm. A city is not built in a day, and a mine cannot be made at once. At the door of an unwise stock-buying and stock-selling much of the injury to legitimate mining must be laid. The pictures of wealth presented have been, by the magnifying glass of eager desire, brought so near that it seemed as if the hand could almost touch them, and men with stock for sale have labored faithfully and persistently to make the illusion true and to meet the popular demand for quick returns. The result has too often been disappointment and failure, and an unfavorable feeling full of distrust and injustice against an industry which is in every way worthy of the fullest confidence when rightly understood.—*Placer Times.*

The circulation of the standard silver dollar is practically stopped. During the fall and early winter there was quite a demand for the purpose of moving the crops. That demand stopped when the crop movement was over. Since the first of January there has been no call for silver, and all the dollars coined since remain in the Treasury. Moreover, the silver in circulation has found its way back to the vaults. The amount outstanding has steadily decreased. Coinage at the rate of a little over \$2,000,000 per month goes steadily on.

The owners of the East New York drift mine, situated in Steep Hollow, Nevada county, have had eight new cars built to be used in running out the dirt through the tunnel. Mr. Andrews put up the woodwork, and G. M. Halsey the ironwork of the cars. Seven of them are constructed with side dumps and one with movable bed and end dump. They have all been taken over to the mine. The cost was about \$80 each.—*Placer Times.*

Grading on the Denver, Western & Pacific is completed between Denver and Longmont, and the track-laying has begun. The graders are at work on the line west of Longmont. It is not yet decided whether this line to the mountains will be a broad-gauge. The road will be in operation from Denver to Longmont by September 1st.

SUPERINTENDENT ADAMS, of the Indian Queen property, near Benton, Mono county, says that the mine has enough ore in sight to insure, for eight or ten months to come, the company's regular dividends of \$17,000 to \$18,000 per month.

The surveyors engaged in the preliminary work of locating a railroad to the Deer Creek coal field, Arizona, have completed their survey from Wilcox to the mines, and are now going over the route from Picacho to Deer Creek.

A good deal of prospecting is now being done in the Walker River country.



## News in Brief.

SMALL-POX is waning in San Francisco.  
FRONTIER men anticipate Indian trouble in Nebraska.

FEARS are felt in Klickitat W. T., of a grass-hopper plague.

THERE is not a Chinaman in Vermont and none are needed.

TUCSON, A. T., has a yeast powder factory and several flour mills.

It is said that there are 1,200 acres of coal fields near Fort Wingate, A. T.

RECENT rains have insured abundant crops throughout western Washington Territory.

AN amendment to the Land bill, opposed by Gladstone, was defeated in the Commons by a vote of 163 to 46.

ONLY 104 persons out of 600 were saved from the disastrous wreck of the Victoria, Canada West, last week.

The first threshing of the season has begun in Salt River valley, and there will soon be new grain in central Arizona.

EDWARD TRICKETT, the Australian carman, and Kelly, ex-champion of England, sailed from London for New York on the 28th ult.

ONE THOUSAND union men in the iron works at Covington and Newport, Kentucky, have agreed to strike for an advance of wages.

MIDHAT PASHA declares that the story of the murder of Abdul Aziz is a tissue of falsehood, and that Abdul committed suicide.

SINCE the local option law went into effect in Massachusetts 46 towns have voted not to grant liquor licenses, and eight towns to license sales.

THE Trustees of the Napa Insane Asylum have purchased 402 acres of land from W. H. Coombs for \$12,000. This makes the Asylum property include about 900 acres.

THE announcement is made that the American line of steamships trading with Brazil has been suspended for lack of support. Subsidized British competition has destroyed it.

ELECTRIC lighting is in successful operation on more than 60 steamers of the Mississippi river and its tributaries. It is believed to add much to the safety of that kind of traffic and traveling.

THE work in the Southern Pacific Railroad machine shops in Los Angeles embraces all locomotive repairs pertaining to the Yuma, Los Angeles, Santa Monica, Wilmington and Santa Ana division.

THE Pimas on the Agency in Arizona are succeeding in farming. There are about 4,000 Indians on the reservation. Water has lately been brought through a six-mile ditch from the north branch of the Gila.

THE committee at Los Angeles who have examined the act of 1859, authorizing a division of the State of California, submitted their report Thursday, that said act is still valid, and that all that is needed to make it effective is the concurrence of Congress.

CHARLES and Thomas Gilchrist, with Thomas Sharpe, have secured the wood and timber contract from Bliss, Yerington & Co. for the Mono lake timber business. The contract calls for 30,000 cords of wood and 7,000,000 ft. of lumber, to be delivered at Bodie before next winter.

THE Santa Barbara Press states that 6,000 acres of land in that county have been disposed of at less than \$2 per acre. The owners of large grants and ranches of from 10,000 to 50,000 acres, who heretofore would not sell, are now dividing their land and parting with it at low figures.

UNDER orders from the War Department, Gen. Pope is stationing troops at accessible points for service in case there should be trouble with the Ute Indians when their removal under the Ute treaty is to be consummated. Care is taken that no movement of the troops likely to excite the Indians is made.

BLOSSOM's artesian well, lately sunk on his ranch near Battle Mountain, Nev., is pronounced the best in the State of Nevada. It is only 165 ft. deep, still it throws the water to a height of 10 ft. above the surface of the ground. The water is clear and pure, and flows at the rate of 50,000 gallons every 24 hours.

RINICRI, Governor of the National bank, Greece, is negotiating with the government in the name of DeLesseps, with a view to constructing a ship canal through the Isthmus of Corinth, to connect the waters of the Gulf of Corinth with those of the Aegean sea. It is believed that the convention on the subject will shortly be signed.

It is rumored that the North Pacific Coast railroad, together with its rolling stock, real estate, the lease of the San Rafael and San Quentin branch, and all other appurtenances of the road, has been transferred to the bondholders of the road, who will hereafter operate the line. It has been known for some time past that such a course of action has been under consideration.

THE narrow-gauge cars of the South Pacific Coast Railroad commenced to run from the depot, corner of 14th and Webster Sts., Oakland, over the new bridge to the company's landing at the creek, making close connection with all Alameda local and Santa Cruz through trains, and with boats to and from San Francisco. The time from San Francisco to Oakland over the new route is 40 minutes.

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J. F. OSBORN—San Francisco.  
A. C. ROSE—Pacific Coast and Sonoma county.  
C. W. MCCREW—Santa Clara county.  
M. P. OWEN—Santa Cruz county.  
J. W. A. WRIGHT—Merced, Tulare and Kern counties.  
JARED C. HOAG—California.  
R. W. CROWELL—Tehama and Butte counties.  
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IMPORTANT additions are being continually made in Woodward's Gardens. The grotto walled with aquaria is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performances. The floral department is replete and the wild animals in good way. A day at Woodward's Gardens is a day well spent.

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The State Mining Bureau, No. 313 Fine street, is open to the public from 10 o'clock A. M. to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

## Signal Service Meteorological Report.

SAN FRANCISCO.—Week ending May 31, 1881.						
HIGHEST AND LOWEST BAROMETER.						
May 25	May 26	May 27	May 28	May 29	May 30	May 31
29.96	30.07	30.157	30.139	30.068	30.064	30.066
29.906	29.917	30.037	29.906	29.833	29.855	30.004
MAXIMUM AND MINIMUM THERMOMETER.						
60	60	58	66	74	73	69
51	51	49	49	52	53	60
MEAN DAILY HUMIDITY.						
76.3	72.3	68.3	65.3	70.7	62.3	88.3
PREVAILING WIND.						
SW	W	NW	W	W	SW	W
WIND—MILES TRAVELED.						
317	411	445	242	202	203	235
STATE OF WEATHER.						
Clear	Fair	Clear	Clear	Fair	Cloudy	Fair
RAINFALL IN TWENTY-FOUR HOURS.						
						.17
Total rain during the season, from July 1, 1880, 29.17 inches.						

## General Merchandise.

WHOLESALE.

WEDNESDAY M., June 1, 1881.

CANDLES.  
Crystal Wax.....16 @ 18  
Paraffine.....20 @ 25  
Patent Sperm.....23 @ 28

CANNED GOODS.  
Assorted Pine Apples.....2 23  
2 lb cans.....2 23  
Table do.....3 54 @

Jams and Jellies.....3 75 @  
Pickles, br gal.....3 25 @  
Barley or box.....1 67 @

Ht Boxes.....2 50 @ 1 90  
Merry, Faul & Co's  
Preserved Beef.....3 25 @ 3  
do 4 lb doz.....6 50 @ 6

Preserved Mutton.....3 25 @ 3 50  
Beef Tongue.....5 75 @ 6 00  
Preserved Ham.....5 50 @ 5 60

Deviled Ham, 1 lb.....3 00 @ 3 50  
do Ham 1 doz 2 10 @  
Bonanza Pig Feet.....3 50 @ 3 75

2 lbs.....2 75 @  
Spiced Fillets 2 lbs 50 @  
Head Cheese 3 lbs 50 @

COAL-Tobacco.  
Australasian, ton 2 00 @ 10 00  
Coos Bay.....6 50 @ 7 50  
Bellingham Bay.....7 50 @

Seattle.....7 50 @  
Cumberland.....6 13 @ 00  
Mt Diablo.....6 13 @ 00

Lehigh.....6 13 @ 00  
Liverpool.....6 13 @ 00  
West Hartley.....12 00 @ 13 00

Scotch.....10 00 @  
Scranton.....10 00 @  
Vancouver Id.....10 00 @

Wellington.....10 00 @  
Charcoal, sack.....6 00 @  
Coke, bush.....6 00 @

COFFEE.  
Sandwich 1d lb.....13 @ 14  
Costa Rica.....13 @ 14  
Guatemala.....13 @ 14

Java.....13 @ 14  
Manilla.....15 @  
Ground, in cs.....22 @ 25

FISH.  
Sacto Dry Cod, 5 00 @ 5 50  
do in cases.....5 00 @ 5 50  
Eastern Cod.....7 00 @ 7 50

Salmon, bbals.....7 00 @ 7 50  
Ht bbals.....3 50 @ 4 00  
1 lb cans.....1 12 @ 1 22

Pt Cod, bbals.....1 12 @ 1 22  
Ht bbals.....1 12 @ 1 22  
Mackerel, No. 1.....3 50 @ 4 00

Ht bbals.....3 50 @ 4 00  
In Kils.....1 55 @ 1 80  
Ex Moss.....3 50 @ 4 00

Pickled Herring, box.....3 00 @ 3 50  
Boston Smoked Herring.....65 @ 70  
etc.

Plaster, Golden Gate Mills.....3 00 @ 3 25  
Land Plaster.....10 00 @ 12 50  
Lime, Santa Cruz bbl.....1 25 @ 1 50

## Metals.

(WHOLESALE.)

WEDNESDAY, June 1, 1881.

IRON.—American Pig, soft, ton.....@ 30 00  
Scotch, Pig, ton.....@ 28 00  
American White Pig, ton.....@ 26 00

Crescent Pig, ton.....@ 26 00  
Rutland Pig, ton.....@ 26 00  
Horse Shoes, keg.....7 00 @ 8 00

Nail Rod.....@ 9 00  
Norway, according to thickness.....8 10 @ 9 10  
English Cast, lb.....16 @ 18

Black Diamond, ordinary sizes.....13 @ 15  
Drill.....9 @ 10  
Flat Bar.....9 @ 10

Flat Bar.....9 @ 10  
Flat Steel.....9 @ 10  
COPPER.—Ingot.....@ 52

Sheet.....@ 52  
Sheading.....@ 52  
Nails.....@ 52

Bolts.....@ 42  
Old.....@ 18  
Bar.....@ 18

Precipitate, 100 lbs.....18 @ 19  
LEAD.—Pig.....@ 41  
Bar.....@ 42  
Sheet.....@ 42

Shot, discount 10% on 500 Bags.....@ 2 10  
Drop, per bag.....@ 2 10  
Buck.....@ 2 50

CHILLED.—Tin Plates.—10x14 C Charcoal.....@ 7 25  
10x14 C Coke.....5 76 @ 6 25  
Banca Tin.....@ 20 00

Australian.....@ 20 00  
1 O. Charcoal Roofing 14x20.....@ 20 00  
20x28.....@ 21 00

ZINC.—By the Cask.....@ 10  
Zinc Sheet 7x3 ft. 7 to 10 lb, less the cask.....10 @ 11  
NAILS.—Assorted sizes.....3 50 @ 3 75

## Leather.

(WHOLESALE.)

WEDNESDAY, M., June 1, 1881.

Sole Leather, heavy, lb.....30 @ 32  
Light.....25 @ 28  
Jodot, 9 to 10 Kil, doz.....35 @ 40

11 to 13 Kil.....50 @ 55  
14 to 16 Kil.....65 @ 70  
Seco Cboles, 11 to 16 Kil.....40 @ 45

Simou Ulmo, Females, 12 to 13 Kil.....52 @ 55  
11 to 15 Kil.....61 @ 65  
16 to 17 Kil.....67 @ 70

Simon, 18 Kil.....61 @ 65  
20 Kil.....65 @ 70  
24 Kil.....70 @ 75

Kips, French, lb.....1 00 @ 1 31  
Cal, doz.....12 @ 15  
Eastern Calf for Backs, lb.....1 00 @ 1 25

Sheep Roans for Topping, all colors, doz.....9 50 @ 10 00  
For linings.....6 50 @ 10 00  
Cal, Russet Sheep, Kilnns.....@ 4 50

Doat Legs, French Calf, pair.....@ 4 00  
Good French Calf.....@ 4 50  
Best Jodot Calf.....@ 5 25

Leather, Harness, lb.....@ 45  
Ft Bridle, doz.....@ 35  
Skirting, lb.....30 @ 37

Welt, doz.....@ 30  
Buff, ft.....17 @ 20  
Wax Side.....19 @ 20

## Gold, Legal Tenders, Exchange, Etc.

(Corrected Weekly by SUTRO & Co.)

SAN FRANCISCO, June 1, 3 P. M.

SILVER, 1. GOLD BARS, 890@910. SILVER BARS, 10@15 @ cent. disc.  
EXCHANGE on New York, 10; London, 49@49 1/2; Paris, 5.20 francs @ dollar; Mexican dollars, 30@32.  
New York (6 per cent), 118 1/2.

INCERSOLL  
ECLIPSE ROCK DRILLS.

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One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting-drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

REYNOLDS & RIX,  
49 Fremont St., S. F.

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

## ANNUAL MEETING.

GOVER MILLING AND MINING COMPANY.—The regular Annual Meeting of the Stockholders, for the election of a Board of Directors, will be held on Tuesday, June the 14th, 1881, at 2 o'clock, P. M., at the office of the Company, No. 402 Front street, Room 8, San Francisco, California. W. O. WILSON, Secretary.

Wolverine Gravel Mining Company.—Location and principal place of business, San Francisco, California. Location of works, Roach Hill, Placer county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Thirty-first (31) day of May, 1881, an assessment, No. Two (2) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately to the Secretary, at the office of the Company, No. 325 Front Street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the First (1) day of July, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the First (1) day of August, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. E. J. BLANDING, Secretary.

Office, No. 325 Front Street, San Francisco, Cal.

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FOR YOUNG LADIES.

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MISS H. N. FIELD, Principal.



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PRACTICAL BOILER MAKER.

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Water Buckets, Gasometers, Girders,  
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Flouring Mills, Saw Mills and Quartz Mills Machinery  
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FRISCO, BEAVER COUNTY, UTAH.

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For both Galena and Copper Ores of the Most Improved Construction.

Having Built nearly every successful working Furnace on the Coast, we are prepared to guarantee the best results  
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Embracing all Known Improvements.

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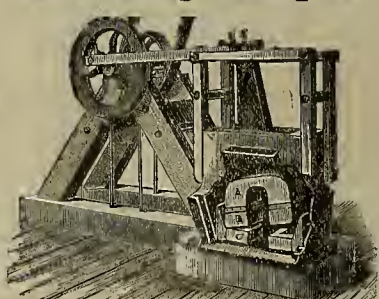
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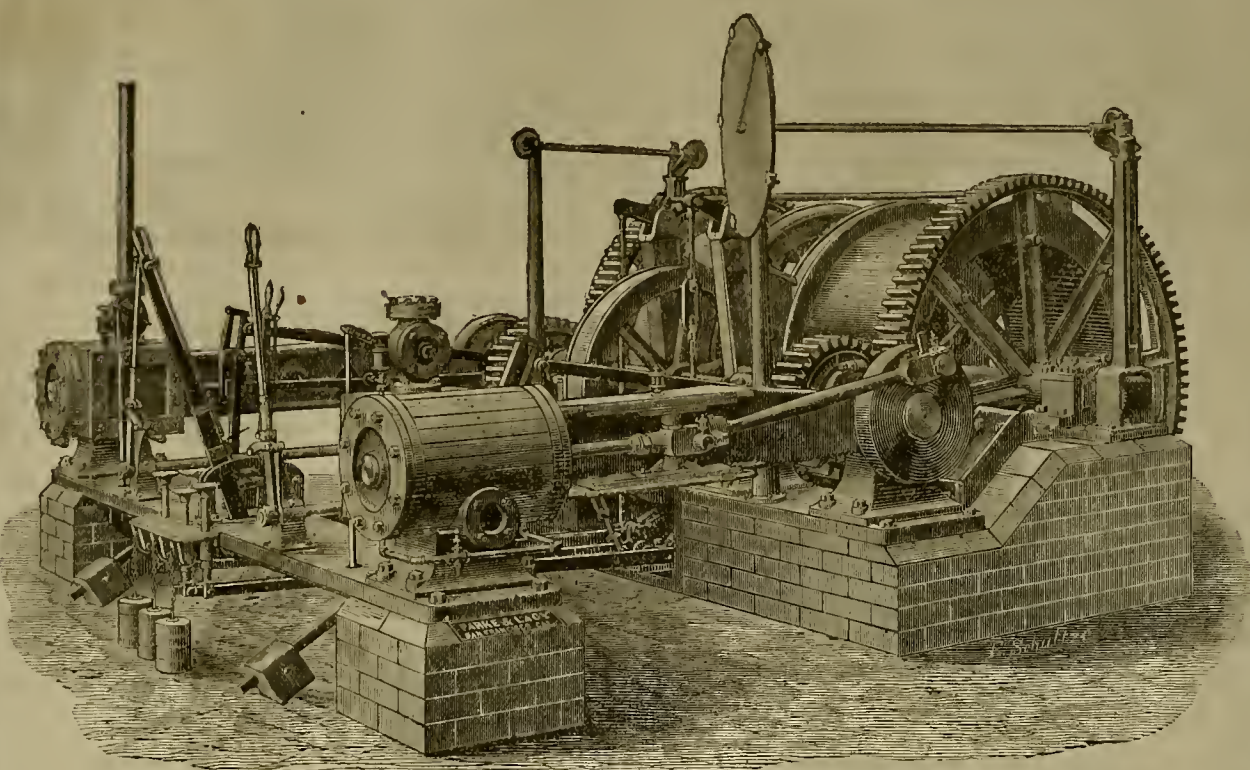


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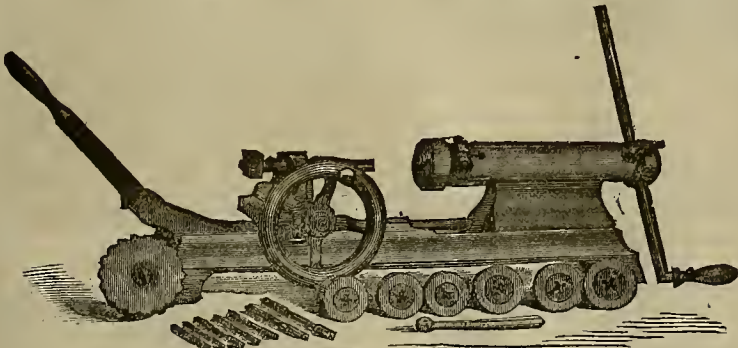
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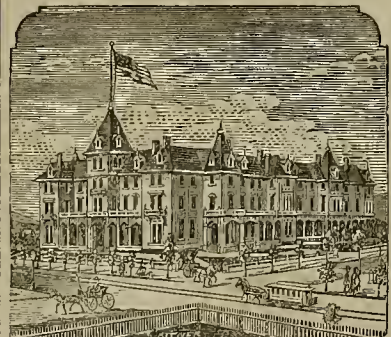


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STEAM ENGINES, BOILERS, STAMP MILLS, FRUE VANNERS  
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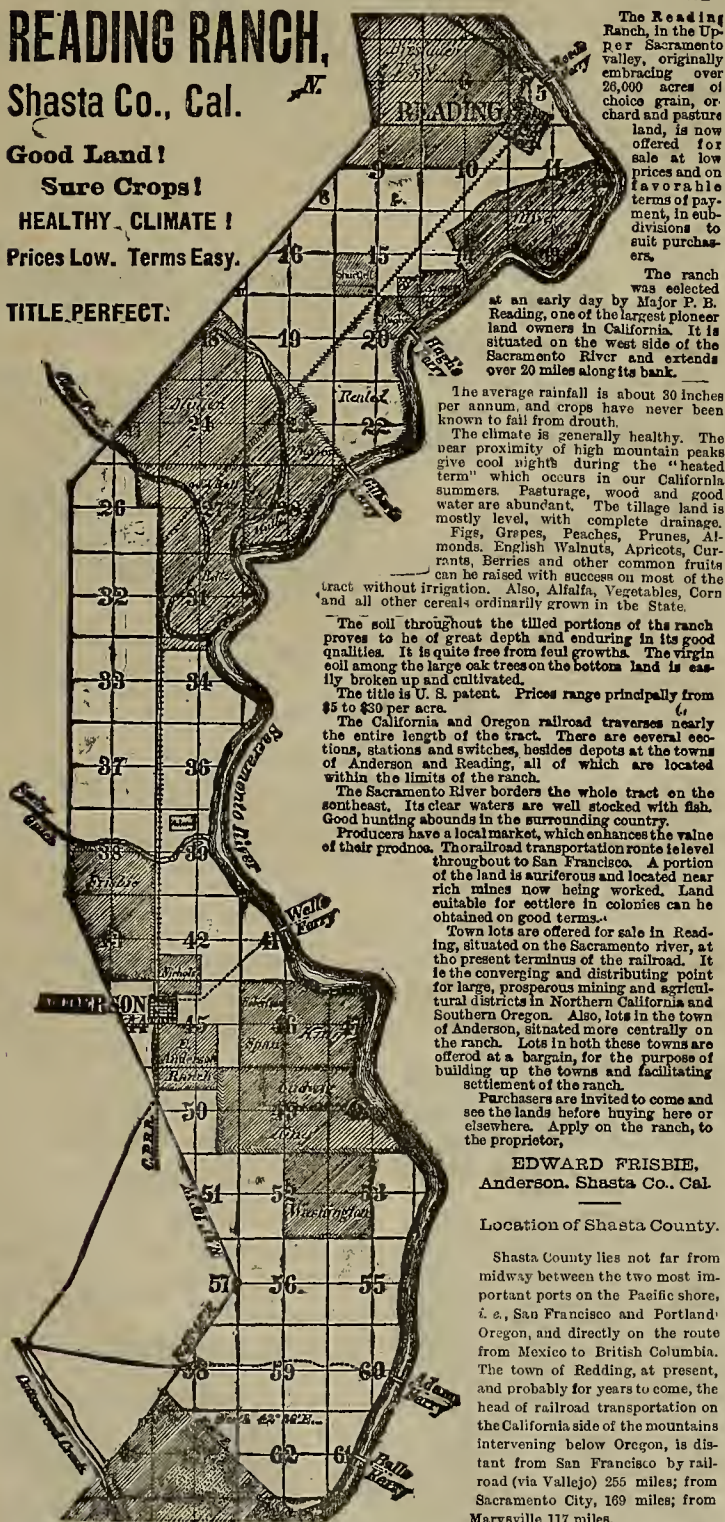
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The ranch was selected at an early day by Major P. B. Reading, one of the largest pioneer land owners in California. It is situated on the west side of the Sacramento River and extends over 20 miles along its bank.

The average rainfall is about 30 inches per annum, and crops have never been known to fail from drouth. The climate is generally healthy. The near proximity of high mountain peaks give cool nights during the "heated term" which occurs in our California summers. Pasture, wood and good water are abundant. The tillage land is mostly level, with complete drainage. Figs, Grapes, Peaches, Prunes, Almonds, English Walnuts, Apricots, Currants, Berries and other common fruits can be raised with success on most of the tract without irrigation. Also, Alfalfa, Vegetables, Corn and all other cereals ordinarily grown in the State.

The soil throughout the tilled portions of the ranch proves to be of great depth and enduring in its good qualities. It is quite free from foul growth. The virgin soil among the large oak trees on the bottom land is easily broken up and cultivated.

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The California and Oregon railroad traverses nearly the entire length of the tract. There are several sections, stations and switches, besides depots at the towns of Anderson and Reading, all of which are located within the limits of the ranch.

The Sacramento River borders the whole tract on the southeast. Its clear waters are well stocked with fish. Good hunting abounds in the surrounding country.

Producers have a local market, which enhances the value of their produce. The railroad transportation route is level throughout to San Francisco. A portion of the land is auriferous and located near rich mines now being worked. Land suitable for cattle in colonies can be obtained on good terms.

Town lots are offered for sale in Reading, situated on the Sacramento river, at the present terminus of the railroad. It is the converging and distributing point for large, prosperous mining and agricultural districts in Northern California and Southern Oregon. Also, lots in the town of Anderson, situated more centrally on the ranch. Lots in both these towns are offered at a bargain, for the purpose of building up the towns and facilitating settlement of the ranch.

Purchasers are invited to come and see the lands before buying here or elsewhere. Apply on the ranch, to the proprietor.

**EDWARD FRISBIE,**  
Anderson, Shasta Co., Cal.

Location of Shasta County.

Shasta County lies not far from midway between the two most important ports on the Pacific shore, i. e., San Francisco and Portland-Oregon, and directly on the route from Mexico to British Columbia. The town of Redding, at present, and probably for years to come, the head of railroad transportation on the California side of the mountains intervening below Oregon, is distant from San Francisco by railroad (via Vallecjo) 255 miles; from Sacramento City, 169 miles; from Marysville 117 miles.

Persons thinking of buying or renting land will not likely regret a camping or excursion trip to this upper Sacramento country.

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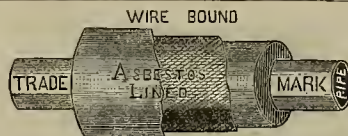
## DuBOIS' Automatic Quicksilver Feeder.

A machine for feeding quicksilver to the mortars of GOLD MILLS. It is so connected to the cam shaft, that each revolution of the large ratchet wheel, which can be regulated to revolve once in one, two, three or four minutes, as desired, dips a small cup into a reservoir of quicksilver, and by a mechanical movement, empties the contents into a pipe leading down to the mortar, supplying an exact quantity at regular intervals, superseding ordinary hand-feeding, which is of necessity subject to great irregularity, and liable to neglect. It renders the amalgamation of all the gold in the pulp equally certain and perfect. Price complete, \$100.00. Send for circular.

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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
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Number 24.

## A Curious Amalgamator.

An inventor named Dickson, of Spearfish City, Dakota, has devised the amalgamator shown on this page. The apparatus has a supply-hopper and a number of downward and upward passages connected with scroll-shaped receptacles, arranged in such a position that the pulp from the stamp mill is spread out in thin sheets and the current caused to revolve with great velocity, whereby the gold and quicksilver are brought thoroughly and intimately into contact and remain in the receptacles, while the current carries off the debris.

There may be more or less receptacles. The pulp from the mill is to be fed to the hopper in a regular and constant stream, and running down the first port, it will be spread out and caused to flow with great velocity, in consequence of the small comparative size of the port, and the stream entering the first receptacle, to which the quicksilver has been previously supplied, is caused to whirl around, and the gold and mercury are brought intimately in contact throughout the mass in every port, and the amalgamation facilitated.

The stream will rise in the ascending port, and from thence over and down to the second receptacle, where the operation is similar.

The ascending ports are larger than the descending ones. The velocity is just sufficient to carry off everything that is of less specific gravity than gold or quicksilver. The receptacles are each to be supplied with quicksilver, and the number of the series and the size of the parts are to be such that nothing of value shall pass out the discharge opening.

To facilitate the regulation of the velocity, the inventor perforates the walls of the last descending port and puts plugs in the holes, as shown. By removing the plugs or a number of them, the ejection in the ports will be diminished and the velocity of the current checked. Little or no mud will be left in the receptacles to accumulate and prevent contact of the gold and quicksilver. The velocity of the current will carry off the heavy as well as the light mud.

## Filing Mining Claims on Sunday.

Some time since an adverse claim to a mine in Nevada, patent for which had been applied for, was rejected by the Commissioner of the General Land Office, for the reason that the adverse claim was not filed within the time set by law. It was one day late; that is, it was filed on a Sunday, and the Commissioner held that "officers are not expected nor required to transact official business after office hours, nor to have their offices open for the transaction of business on Sunday." The claim was therefore considered as filed on Monday, which was a day too late to cover the law. That is, the 60th day of publication fell on a Sunday, but at 10 P. M. of the day before the adverse claim was presented to the Register, with the fees for filing, but he refused to take the claim or fees. On the next day (Sunday) the claim and fees were tendered to the Receiver of the Land Office, and he took them.

When the Commissioner of the Land office decided that the Sunday filing was illegal, the claimants appealed the case to the Secretary of the Interior, Hon. Carl Schurz. He reversed the decision, holding that in the absence of a law to the contrary, an adverse claim may be filed on Sunday or out of office hours, if the local officers are willing to receive it; though they are not required to receive adverse claims or transact other business except during regular office hours. He found no law of the United States prohibiting them from transacting such business on Sunday if they chose to do it. Nor could he find any law of the State of Nevada which prohibits the transaction of ordinary business on the Sabbath day.

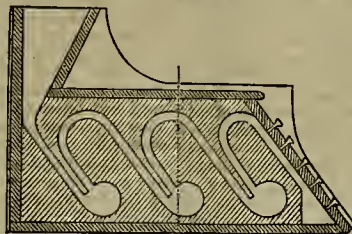
CALIFORNIA has been in American possession but 34 years, and its exports and imports are this year more than twice as great as those of the 27 States and two Territories which compose the Mexican republic, though California's population is less than one-twelfth and its area not more than one-fifth of hers.

## Academy of Sciences.

### Wrangel Land and Arctic Exploration.

At the meeting of the California Academy of Sciences on Monday evening, a reception was tendered to Lieut. Roht. M. Berry, of the U. S. steamer *Rodgers*, and his staff of officers, belonging to the U. S. Arctic Exploring Expedition dispatched by Congress to the relief of the *Jeanette*.

The seating capacity of the hall was too limited for the audience, and many persons were compelled to stand. Lieut. R. M. Berry, Ensign H. M. Hunt, Col. W. H. Gilder, *Herald* correspondent; Assistant Surgeon Costello, Assistant Engineer A. V. Zane, Past Assistant Surgeon M. D. Rodgers, of the relief ship *Rodgers*, and Capt. Howgate, the organizer of two Arctic expeditions bearing his name, occupied



DICKSON'S AMALGAMATOR.

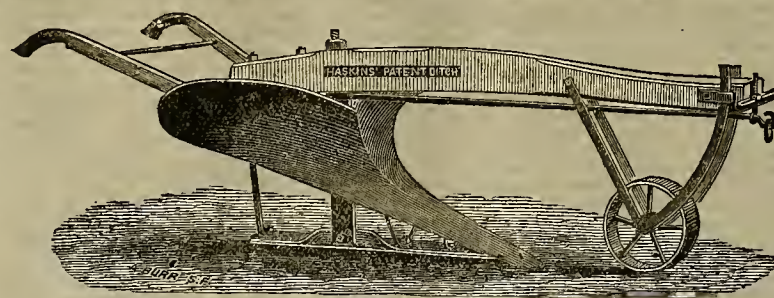
seats on the platform. President George Davidson occupied the Chair. After some unimportant preliminary business, a highly interesting and complete paper on evidences regarding the discovery of Wrangel Land, and the course pursued by the exploring ship *Jeanette*, was read by Charles Walcott Brooks.

Prof. Davidson read a paper prepared by James Gamble, retiring General Superintendent of the Western Union Telegraph Co., advocating the use of a 20-lb. per mile steel wire for the maintenance of telegraphic and telephonic communication between the sledge parties sent out

the Navel Relief Board have profited materially in making up the route by which we are to go out. It will be followed as strictly as practicable. In regard to the experiments with wire, I shall be very happy, indeed, to make those, testing them in every way. I think, however, that it will be very difficult on extended sledge journeys, for the reason that we have an immense weight to haul. When you speak of additional dogs to haul the wire, you must take into account that they will require additional food and additional material on board ship. We find that all Arctic ships, when starting from port, are overloaded with material. The *Jeanette* went out of here loaded to the water-line. I am fortunate in having a larger ship, but she is now crowded, and will be overcrowded when we get the other stores. It will be very difficult to take much wire. When you take that you must give up coal and other things which are very material. I also would be very happy to make those experiments with the signals that were referred to. I don't think it will be necessary

to refer to my journey as we have had it explained as far as I can explain it myself now, because after reaching Wrangel Land I shall have to be guided by circumstances. There I shall find a new country that has not been explored, and after reaching there I shall have to form new plans."

W. H. Gilder, who goes with Lieutenant Berry as Pay Clerk, and who was a member of the Schwatka expedition last year, presented the Academy with a piece of hammock, evidently part of a fishing pole, one of the relics of the Franklin expedition, of whose wrecked ship



HASKINS' PATENT DITCHING AND EXCAVATING PLOW.

and the winter headquarters of the Arctic expedition. We give this paper in full in another column.

In reply to an inquiry from Professor Davidson, Lieutenant Berry said he did not consider the claim of Captain Dollman to the discovery of Wrangel Land well founded, as he had waited for fifteen years before speaking of it.

Captain Howgate referred to two Arctic expeditions which had been sent out by himself, and to a third which would leave Newfoundland this year in charge of Lieutenant Greeley, and which was outfitted by the War Department. The latter, he said, carries among other supplies a telegraph wire, flags and candle bombs. Lieutenant Greeley is instructed to look out for the *Jeanette*, as it is possible Lieutenant DeLong and his associates may be carried by the Arctic currents in the North Atlantic.

Lieutenant Berry, Commander of the relief ship *Rodgers*, was then introduced, and spoke as follows:

"I wish to take this occasion to thank this Academy for the information by which I and

and records Lieutenant Schwatka went in search.

KERN COUNTY MINES.—A correspondent of the Press sends us the following items from Sumner, Kern county: "The men at Kernville who have got the Big Blue mine and mill have worried along the past year with men on tribute. Lately, the miners went through the foot-wall of their Sumner mine and struck a four ft. pay vein that will run \$35 per ton; so 40 stamps are running right along. This makes flush times at Kernville. The Pinto or Lone Star mill is to be torn down and removed to San Francisco for Parke & Lacy. A company have bought a small mine on Pinto mountain, and are working Chinese miners on quartz."

It has been thought that more satisfactory investments could be made in developed mines than in prospect holes, but many investors think that this is wrong, and that prospects which show good ore and true fissure veins, are better than developed mines.

## New Ditching Plow

Alphonso Haskins, of Davisville, Yolo county, has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, an improved ditching and excavating plow which is illustrated on this page. The improvement consists of a shoe which is fitted to run upon the bottom of the trench or excavation, and has a suitable point for digging or loosening up the soil. Peculiarly shaped shares, having a narrow, flat front portion, extend upward and backward at an incline so as to carry the earth above the level of the ground, and from this point the shares curve outward so as to throw it away from the trench on each side.

The plow has a coulter-wheel as shown, arranged to raise or lower by hinged or pivoted standards. The plow standard is suitably secured to the beam and the shoe is bolted or fixed to its foot. This shoe is of considerable length, narrow and flat upon its bottom, so as to run upon the bottom of the trench and smooth and level it similar to the action of a plane.

The point is formed or secured upon the front of a bar or plate, which has its upper end secured to the standard and extends down to the front of the shoe, thus forming a support for the shares, which may be bolted to it.

The shoes conform to the outline of this bar, and are made narrow and flat at their lower front end so as to receive the earth from the point, having about the same width. This flat surface extends upward and backward, widening slightly up to the point where the shares begin to curve outward. The surface of this portion is nearly in a straight line from the point, and brings the earth up to the flaring portion of the shares, which then take it and throw it outward upon each side, and entirely clear of the trench.

By this means Mr. Haskins is enabled to form trenches of any desired depth, having a perfectly smooth flat bottom, suitable for laying cement or other pipes. This plow is especially adapted for the formation of trenches in which irrigating pipe is laid, when said pipe is formed and laid at one operation, from the plastic material. It can also be used in making mining ditches, etc.

## Ore Sampling.

The ore sampling works of Hofmann Bros., 415 Mission street, of this city, have of late been displaying an unusual activity in crushing and sampling ores which they receive from all parts of the Pacific slope, Alaska, Mexico and Central America. The most remarkable ore they ever received was a lot, the other day, from Chihuahua, Mexico, consisting of five tons ranging from \$5,000 to \$15,000 per ton in value; in fact it contained so much native silver that the precious metal clogged up their machines and necessitated the picking out of the largest pieces of solid silver, some of them weighing 11 lbs. and over. It certainly was a wonderful sight to admire, these beautiful specimens in their different formations, and almost seemed a pity to see them committed to their powerful crusher to be shivered to fragments. A beautiful specimen of this ore may be seen at the State Mineralogical Museum under the charge of Mr. Hanks and also at the office of Mr. Jno. M. Adams of this city, who has charge of the ore.

Other high-grade ores are constantly worked at these mills. The more conspicuous among them are the Silver King Concentrations and monthly shipments from the Jocuistita mine, Mexico, of Mr. J. B. Haggin, of this city. Owing to the increase in their business, the works have recently been enlarged, and, to fill a long needed want, one of Mr. M. B. Dodge's concentrators has been set up where low graded ore, which are otherwise almost valueless, can be concentrated and made to yield quite a revenue to their owner.

Persons interested in ores and mines generally are invited to inspect their works where all desirable information will be cheerfully furnished.

SENATOR JOHN F. MILLER will return to San Francisco in July.



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

### The Owens River Country.

Bishop's Creek and Plute Mining Districts.

**EDITORS PRESS:**—After many years of silence I wish to renew a correspondence with your paper, and will try to make it regular, so that your readers may keep themselves posted in regard to this portion of our State. Eighteen years ago, when your correspondent first came to Owens river, the country presented a far different aspect from its appearance now, upon his return. In 1863 but one farmhouse could be found in the valley; now there is hundreds. Then the adjacent mountains were being run over by prospectors in search of hidden wealth, and little attention was paid to farming; a few mining towns sprung up, only to disappear when capital was withdrawn from their support, and other towns appeared as soon as the fast growing agricultural interests of the valley required them.

But a new era is about to dawn, apparently, upon this quiet valley. Rich mineral-bearing veins have been known for years to exist in the White Mountain range, east of and opposite Bishop creek; and many ledges have lain idle for years, apparently waiting the advent of improved machinery and cheaper freight transportation. That time has now arrived, and many mine owners are making earnest efforts to develop their mines and place them in proper shape.

#### The Discovery Last Fall

Of a very valuable gold mine, which is now proving to be an extensive one, gave a new impetus to the mining industry. This mine has been recently sold. What the consideration is I have not learned. The parties purchasing are from Bodie. I have no doubt their intention is to erect a mill and commence the working of ore as soon as possible, as the mine is easy of access, the facilities good for either water power or steam, and the ore free-milling. Probably a better piece of mining property cannot be found unoccupied on the coast.

They are down upon the ledge 56 ft. At the surface the ledge was five ft. in width, at the bottom of shaft is seven ft. wide, having increased in width gradually from the surface. Eighteen tons of ore, taken from the shaft, and worked in three Mexican arrastras, yielded 66 ounces of gold, or a little over \$1,000. Much of their rock will assay \$400 or \$500 per ton, and some samples will go into the thousands. Two mining districts have been formed, one, the

#### Bishop Creek District,

Lies east of town, and the mines lie within a distance of from six to twelve miles.

Some 50 locations have been made, and probably 10 or 12 of these are being worked upon, and already showing good prospects.

From samples brought to town by different parties, I find that the ore consists of a great variety. Some free gold ores, some silver sulphurets, and chlorides, and others of carbonates and galena. The ore, as a class, is what might be called medium in value, neither a high nor a low grade, usually assaying from \$60 to a \$100, some samples reaching \$300 or \$400.

At a distance of 12 miles from town, to the northeast, another district has been organized, under the name of the

#### Plute Mining District,

Where some 30 locations have been made.

This district lies wholly in the county of Mono, and adjoining the northern line of Inyo. An old mine has recently been re-located, and the present owners are opening it up in good shape. This mine was first located in 1857 by a party of surveyors, and again located in 1863. In 1864 an incline was sunk to the depth of 75 ft. on a spur to the main ledge, but when capital was withdrawn from Aurora, Owens River suffered in like manner, and the mine, like many other valuable properties, relapsed to the ownership of the Government. The value of the mine was scarcely known, and only the high grade of some of the ore induced the present owners to attempt its development, and they are meeting with most excellent success.

The main ledge is very large, cropping out holdly for 2,000 ft. in length, with an average width of 12 ft. It is situated entirely in brown porphyry with birdseye and light gray porphyry adjoining the ledge and forming its walls.

They have several adjoining claims, several of which are spurs to the main ledge, and others parallel veins, some of which carry a large percentage of gold. The character of the ore is chiefly a gray sulphuret of silver, with chlorides and oxides. Their assays, taken from nine different portions of the ledge, average about \$150, varying from \$38 to \$300 per ton. At present they are at work on the main ledge, about midway of the croppings, and are down 20 ft.; have a width of ledge of 10 ft., 6 ft. of which is good milling ore, with an average assay of \$160. This mine is situated in one of the most favorable localities. Water can be conveyed by pipe, a distance of two and a half miles, and 50 inches or more if needed can be delivered upon any portion of the mine. A mill can be erected there and Burleigh drills used in mining. I have visited the ground and am of the opinion that there is ore enough to justify the erection of a 40-stamp mill.

There is an abundance of nut pine timber above the mine, and easy of access. This mine, like the one previously mentioned, is easy to reach from the valley by a good wagon road already graded and in constant use within a mile of the mine.

#### The Prospects of these two Mining Properties

Are now the constant theme of conversation upon the street, and the farming town of Bishop Creek is fast becoming transformed into a veritable mining camp. Almost daily we can see loads of provisions, mining tools and supplies, leaving town for the mines.

Another topic also is becoming a common subject of conversation. It is the universal belief that the railroad that is now running to Hawthorn will eventually enter Owen's valley, and run thence to Mojave. This, it is predicted, will be accomplished within two years.

The agricultural interests of Owens Valley is in a very prosperous condition, and everything denotes good crops and speedy sales. The mining camps east of here, Gold Mountain, Lida Valley, Montezuma and Deep Springs, depend upon Owens Valley for much of their supplies, of hay, grain, flour, etc., and as those camps are awakening into renewed life, their demands will be greater upon this mountain storehouse, and all parties will derive benefit from the revival of trade.

Owens River and the entire surrounding region is destined from this time forward, to rank as one of the most prosperous portions of the Pacific coast. Large capital is finding its way into this section, and small capital and population is sure to follow.

CONCORD.

Bishop Creek, May 28th.

### Copper Smelting—Its History and Processes.—No. 9.

[By HENRY HUBBARD VIVIAN, M. P.]

#### Take the Case of Antimony,

It will be seen that the one-thousandth part converts first-rate "best-selected" copper into the worst conceivable, so had as to be only fit for casting as brass; short in fracture and a bright yellow. That one four-thousandth part makes it unfit for anything but inferior brass purposes, below the quality known as tough ingot. That one eight-thousandth part reduces it from "best select" to tough ingot quality, and that one sixteen-thousandth part sensibly deteriorates the quality. You will observe that one-thousandth part of nickel, cobalt, bismuth, arsenic and phosphorus reduces "best selected" to tough ingot quality.

White nickel and arsenic in combination, and mixed in the proportion of one five-hundredth, make copper unfit for brass.

The last trial shows that two substances in combination may often produce a far more hurtful effect than either of them separately. I am indebted to Mr. A. S. Morry for this latter suggestion.

One curious inquiry arises, namely: How is it that any given

#### Admixture of Another Metal

With brass causes it to change its character, if that admixture is infinitely small? I remember well that some 35 years ago, just after I had finished my synthetical trials, I had a conversation with the late Mr. George Frederick Muntz, the inventor of yellow metal, who was probably the best brass manufacturer of his day, upon this point, namely, the brittleness and yellow color of bad brass. He told me that he could not explain it, and that, although he had sought an explanation from some of the best chemists of the day, not one of them had been able to give him a satisfactory reply. I was very young at that time, and felt proportionately proud of being able to give him such an explanation as he at once admitted to be satisfactory. It was as follows, and I believe it is contained the true cause of brittleness and toughness in all metals: During my experiments, I had observed a case—I think it was the admixture of a certain amount of tin with brass, in which the fracture was rough, coarse and mottled, drab and yellow. Upon close examination, I discovered that this appearance was due to the metal being composed of large crystals. I found that the mottled appearance was due to some of these large crystals being broken through, while others had separated, having their facets bright and unbroken. The former presented a drab appearance, while the latter, reflecting back the light, were bright yellow. I at once saw that the brittleness and yellow color of bad brass were due to the crystallization being extremely small, so that each crystal, being very minute and having an existence separate from its neighbor, parted without fracture, and, possessing unbroken facets, reflected back a yellow light like polished brass. This is further confirmed by the well-known fact that if, instead of allowing bad brass to cool slowly, you quench it in water and thus change its crystallization, it is no longer brittle and yellow when broken. When a metal forms in long crystals in cooling, it is sure to be tough; but when the crystals are fine and sand-like, then it must be brittle. I believe this same law applies to all metals.

Now, having spoken so much of bad copper, I may naturally be asked how to make good and

#### How to Avoid Making Bad Copper.

I fear my answer can neither be complete nor satisfactory; but I may at least contribute something toward the solution of the various problems involved in this difficult question.

My first advice is; to do your best to deter-

mine beforehand the quality of the ores you have to treat, and never to mix a had ore with good ores. I speak in the plural because it is surprising how small a quantity leavens the whole lump.

My next advice is, that, when you have once got impurities out of your smelting mixtures, never put them back again. One of the greatest improvements we have ever effected in copper smelting is never to allow roaster or refinery slags to be melted in the metal furnaces, but to treat them by themselves. It is true that by so doing you lose the advantage of their oxidizing action, but that is a small matter compared with the perpetual addition of deleterious substances to your mixture.

Then I would say, avail yourself of the old "best selected" or "regule" process where your material contains impurities which pass into the copper bottom formed in that process. All the foregoing recommendations refer to copper material in course of treatment, not to copper itself when once made. What are we to do with bad copper? My answer is, that that is a question of degree. Copper may be so bad as to be only fit for casting as brass. In that case, make up your mind to sacrifice a pound or two per ton, instead of expending perhaps twice as much in trying to make it better. It is no doubt difficult to make had metallic copper into good, but by our present improved methods much may nevertheless be done. I think about the year 1851 or 1852, I accidentally hit upon a plan of improving metallic copper, which has stood us in very good stead ever since. I was experimenting on the separation of nickel and cobalt, contained in some ores we were then receiving, by the admixture of arsenic, and I naturally managed to get an excessive quantity of arsenic into the copper so experimented on, which did not improve its quality. Arsenic was retained by the copper through the refining process, and was present in the tough cake copper sent to the mills. This copper was tried by rolling in the usual way, and the trials, which were of course extremely bad, were laid out for my edification and inspection on the iron plates of the mill floor. To my surprise, in turning them over, I saw that the iron plates on which these trials had cooled were as white as if they had been whitewashed. I saw at once that arsenic had been distilled out from the body of the copper while in the annealing furnace at a red heat, and had continued to pass off even while the copper was cooling on the mill floor. It occurred to me that what had happened accidentally might be made available systematically, and I caused had blistered copper to be submitted to a slow, constant, long-continued heat in the roaster furnace without melting it until it was desired to withdraw the charge. To this process I gave the name of "dry roasting." I see that Dr. Percy, on page 380 of his work of 1861, talks of "dry roasting" practiced in former days, as described to him by an old smelter; but that was evidently a wholly different matter, depending on the exposure of pigs of regulus during the greater part of the process of roasting to a less degree of heat than sufficed to melt them, and the roastings were repeated often three times until "blister" copper was obtained. My plan does not come into operation until after "blister" copper is obtained. We always roast our regulus down very slowly; and I do not see how the process above described could have been carried out, since white metal melts at a very low temperature, and parts easily with its sulphur, setting free metallic copper; how the pigs are to be withdrawn from the furnace often three times without melting, I fail to see. I have heard of the frequent calcination of regulus and remelting, practiced in olden days, having the effect of improving quality, and I think the old smelter must have alluded to what was done at some works even in my time, namely, calcining ore-furnace metal only sufficiently to produce "blue" or "red" metal, and then calcining again before producing "white metal." This was called coarse and fine metal molting, but had no relation to the process I have described, which, I believe, were the first to put in practice. I do not even know that it is used at any other works at this moment. The effect of this "dry roasting" of blistered copper is very marked; we can bring up copper which, if refined without dry roasting, is so brittle that it is reduced almost to powder in passing through the rolls, to a tough quality fit for all ordinary copper uses. This is effected by keeping the pigs of blistered copper at a good red heat in a roaster furnace for 24 hours, then melting and tapping in the usual manner; this process is again and again repeated until the desired degree of quality is attained. I have tried the effect of carbonizing, or, perhaps I should rather say, de-oxidizing the copper before tapping, believing that volatile impurities would be more readily sublimed when in a metallic state, but no very sensible difference resulted. The process ceases when the copper is melted.

Another and more recent system of improving the quality of metallic copper is the addition of niter and lime in the refining furnace; to whom the first suggestion is due, I know not; it has been kept, and is to this day, one of those profound secrets which everybody knows and avails himself of when it suits him, without imparting it to his neighbor. This process is as follows: 25 lbs. of nitrate of soda and 75 lbs. of lime are intimately mixed and thrown on the charge of copper in the refinery after the slag has been removed; the charge is then poled or "flamed" for half an hour, and then the slag is skimmed off. If the first operation does not sufficiently improve the copper, it is repeated again and again. We have found that the qual-

ity of copper is decidedly improved by this system, both for brass and copper uses; but I have reason to fear that it is attended with some loss of copper, and it is also expensive if often repeated.

Before taking leave of copper-producing industries, I ought briefly to mention

#### Two Most Important Systems

By which copper is extracted from pyrites rich in sulphur and poor in copper by the wet way; the one I have already alluded to, namely, the system adopted in Spain at the great works of the Rio Tinto and Tharsis companies and at those of Messrs. Mason & Barry; the pyrites is placed in large heaps in the open air; these are set on fire by a layer of wood placed beneath, and continue to burn for many months; the copper contained is partially converted into sulphate, the burnt ore is then washed with water in vats, whereby the sulphate of copper, being soluble, is extracted; the liquor is then run over iron, whereby the copper is precipitated and collected in the metallic state. The residua of this lixiviation are then deposited in immense heaps with a certain proportion of raw pyrites, water is laid on, and the remaining portion of copper is said to be completely washed out in some six years; the liquors issuing from the base of the heaps are, of course, collected, and the copper they contain is precipitated in the manner described above.

The other process is that of Mr. Henderson for the treatment of the burnt pyrites obtained from the kilns of sulphuric acid makers. I have never seen this process, and it would therefore be improper that I should do more than mention it as a process which has proved eminently successful for the treatment of that material, extracting the copper, I believe, very completely and leaving a residue composed of almost pure oxide of iron, valuable in iron smelting. I am informed that the burnt residua of the kilns are calcined with salt so as to convert the copper into a chloride, which is partly volatilized and condensed and partly obtained by lixiviation—first with water and subsequently with dilute hydrochloric acid.

(CONCLUDED.)

### Rehearing on Mineral Land Cases.

In January 1881, the Commissioner of the General Land Office decided certain lands to be agricultural, dismissing the application of mineral affidavits for a new hearing. The latter subsequently asked for a review and modification on the grounds that the land is mineral and that they should have an opportunity to submit testimony to prove the fact.

At the original hearing no one appeared for the mineral claimants. Subsequently affidavits were filed alleging the land to be mineral. At the latter date the General Land Office had no knowledge that the case had been received and accordingly directed a hearing to be held. This was subsequently revoked, the case taken up for examination and the decision above referred to rendered.

The reason assigned by the mineral affiant for neglecting to attend the hearing already had was that they were peculiarly unable to appear.

Rule 76 of the rules of practice provides that rehearings will be allowed in accordance with legal principles applicable to motions for new trials at law.

Pecuniary inability to attend a former trial would not be considered in the courts sufficient ground for allowing a new trial and consequently cannot, under the rule, be looked upon as sufficient ground for allowing a rehearing. Moreover, it is not necessary for a claimant to appear personally at the original hearing; he could do so by counsel.

Also under rule 23 a claimant can apply to have taken the deposition of their witnesses, so that the personal attendance of witnesses is not necessary.

Courts do not allow new trials for causes which proper diligence would have avoided.

Rule 78 requires motions for rehearings to be accompanied by an affidavit that the motion is made in good faith and not for the purpose of delay.

Rule 80 provides that no officer shall entertain a motion in a case after an appeal has been taken from his decision.

The Commissioner, in deciding the motion for a rehearing, says: "As this motion does not allege sufficient grounds for allowing a rehearing, as it is not accompanied by the requisite affidavit, and was made after my jurisdiction to entertain a motion had ceased by reason of the appeal, and as no new discoveries or developments are alleged, the rehearing cannot be allowed." A word to the wise is sufficient, or ought to be, in mineral cases as well as all the other affairs of life.

MINING as an industry, is second to none except agriculture, which without the produce of mines would be much less in the aggregate. The one acts as a stimulant to the other, inasmuch as the products of the agriculturist, as they enter into the necessities of increasing population and commerce, enlarge the demands of the precious metals.

THE mines of Canada and Newfoundland are at last receiving considerable attention. They are drawing to their aid a large amount of capital, as well as the very necessary adjunct, practical mining experience, for the development of their vast mineral resources, both from England and the United States.



## MECHANICAL PROGRESS.

## Iron and Steel.

Good iron and good steel should be of close, uniform grain, bright gray color, more or less of silky fiber. The dull, earthy color, loose texture and unequal grain or blackish fiber are bad signs. Steel fractures are either granular, crystalline or fibrous. Wrought iron fractures are crystalline or fibrous, with intermediate conditions. Wrought iron, if broken suddenly, will show a crystalline fracture, while if broken gradually it will appear fibrous. If it is good iron and suddenly broken, the grains will be fine, bright and uniform. Poor iron suddenly broken shows large, coarse, dull grains. Good iron, gradually broken, shows fine, close fibers, while poor iron gradually broken, shows fibers that are coarse and open.

In comparing irons, all the samples should be broken, or bent, or twisted exactly in the same way, as the mode of testing influences the appearance of the fracture. The pieces compared must be of the same shape and size, and the treatment just the same in every respect; otherwise the tests will be of little or no account. If it should be desired to make the fracture of a piece of iron appear entirely crystalline instead of entirely fibrous all that would be necessary would be to so alter the shape of the specimen as to render it more liable to snap suddenly, or to make it harder by any treatment, or to apply the strain suddenly, so as to make it snap quickly. In the case we show the fibrous structure, the threads are gradually drawn out and are seen externally. In the other, where they are snapped by sudden strain, they are broken square across, and their ends are seen, giving the granular appearance.

When the steel is twisted, the results depend upon the manner of testing, as well as upon the nature of the material twisted. Slowly applied strain gives a silky fibrous structure, while quick breaking gives a granular structure. In both cases the fineness of the fiber or of the grain depends upon the fineness of the material. The color of steel fractures is light pearl gray, the quality having something to do with the shade; but the granular fractures are not lustrous like those of iron.

There are many tables published, giving the strength of different materials used in construction. From these tabulated results of tests that have been made, designers and manufacturers lay out and calculate the dimensions of various machines and structures, allowing a factor of safety, varying from 3 to 6 and even 12, according to the uses and abuses to which the material is to be subjected. But it must not be supposed that these figures are infallible and invariable. This is far from being the case. These figures represent, at best, the mean of several carefully conducted experiments on certain samples, which may or may not be average specimens, and generally are specimens of more than ordinary excellence. In some cases, notably in cast iron, the variation from the average is very great, so much so that in some cases it would absorb all the factor of safety. Bear in mind that these figures are good only as averages.

But there is one thing that is very seldom thought of, and that is, that figures good for one size and shape of plate, or bar of a given material, are not good for other sizes or shapes of the same material, tested under the same conditions. It is found that if tests are made of a number of bars of iron, from any make, made from the same stock, by apparently the same process, and with apparently the same care, the tensile strength per square inch will vary greatly.

The proportion of the increase, in tensile and elastic limit varies just in proportion with the decrease of the percentage of areas of the bar and of the pile.

The inference from all this is that tests made from one size must not be taken as infallibly showing the strength of any other size, and that in the matter of bridge and boiler construction it is best that the tests be made upon equal sizes taken from stock.—*Exchange*.

## The Strength of Wrought Iron Columns.

In a paper contributed a short time since to the American Society of Civil Engineers, Mr. G. Bouscaren has given some interesting results of experiments made on different forms of wrought iron columns, these being of a variety of sections, including hollow hexagonal columns, hollow squares with solid plate and with lattice sides, the well-known Phoenix columns, and H sections. One of the objects of the experiments was to determine the relative trustworthiness of the well-known formulae of Gordon and Rankine for hollow columns, and the results Mr. Bouscaren considers to be in favor of the latter. In the case of the Phoenix posts, the extreme values of the constant  $a'$  in Rankine's formulae were 49,400 and 41,100, a variation of 17%, while in the case of square closed columns with flat ends, the extreme values of  $a'$  were 39,800 and 38,300, a variation of 4% only. Other conclusions arrived at were that iron of the highest modulus does not necessarily make the strongest columns, and that in built-up columns it is highly essential to insure thorough connection between the parts in order to guard not only against lateral flexure of each part but also against relative longitudinal move-

ment. Mr. Bouscaren further states that his experiments bear out Rankine's assumption that in dealing with columns with hinged ends, the value of  $a'$  should be taken as double that used for columns with flat ends.

## Value of Experiments.

It is singular how significance is given to trifling experiences by the recorded or related experiences of others, and how much, that is of importance in our lives, would be lost in its lesson, but for cumulative evidence, or at least additional testimony. And much of this experience is wasted because of lack of mediums for extending it, or for giving its results.

Probably no department of human knowledge is so entirely dependent upon experiment for its advance as mechanics. This is seen in the progressive trials for ultimate success in large engineering works, as the boring of tunnels, the construction of viaducts and bridges, the overcoming of natural, topographical and climatic obstacles shown in the construction of our trans-continental railroads.

In engineering (mechanical) there is much the same record of trial, test, experiment and gradual progress—the progress depending, however, on the success of the experiments. There is not a successful steam engine builder in the country but who must trace success up through tests and experiments; and there is no one who can properly and honestly assume that he has the typical universal engine, adapted to all sorts of work and all circumstances of location. Such absurd claims are sometimes made, but it requires but a little consideration to show how baseless they must be.

Repeated experiments have been required to designate the proper type of hoisting-engine for mines; experiments, some of them very costly, have been made to find the most effective pumping engine; and the list might be made to include engines for wood working, for wool working, for cotton working, for the preparation of materials for manufacturing processes, and for many other purposes. And yet, after all the tests, after all the experiments, there is a great difference in the engines employed for these purposes in different localities and under varying conditions, although the difference in their results may be but slight, and their respective owners may be equally satisfied with their performances.

In shop mechanical work there is also the need of continual experiment, resulting in better adaptation of means to the end, in a better type of machinery and tools for general use; and, also, in a separation and division that gives us special tools and machinery for special objects and intentions. This dependence on experiment is forcibly shown in the necessity for draftsmen and pattern makers. They are among the most important of our workers in mechanics. They are continually originating, and, in some sense, perfecting types of tools and modifications of machines, so that the mechanic who should indulge in a Rip Van Winkle sleep of a decade would find himself in a new mechanical world.

The moral to be drawn from these premises—the correctness of which no "live" mechanic can deny—is that the mechanic art has not yet arrived at that state of perfection when set rules and unvarying law can take the place of empirical test and experimental trial. The progress of mechanical, practical knowledge is in the shop, and not in text books, nor in treatises on well understood mechanical laws.—*Boston Journal of Commerce*.

## Mechanical Terms.

W. Barnet Le Van, gives in the *American Machinist*, the following definitions of a few mechanical terms which are commonly used, but too often only vaguely understood:

Dynamics is the science of that branch of mechanics which treats of force in motion, power and work. It comprehends the action of all kinds of machinery; manual and animal labor, in the transformation of physical work.

Element is an essential principle which cannot be resolved into two or more different principles. The simple physical elements of dynamics are force, velocity and time, and the functions of those elements are power, space and work.

Function is any compound result or product of two or more different elements. A function is resolved by dividing it with one or more of its elements.

Force is any action which can be expressed simply by weight, and which can be realized only by an equal amount of reaction, and is the first element in dynamics. All bodies in nature possess the incessant virtues of attracting and repelling one another, which action is recognized as force.

Velocity is speed or rate of motion, and is the second element in dynamics.

Time implies a continuous perception, recognized as duration, or that measured by a clock, and is the third element in dynamics.

Power is the product of force and velocity; that is to say, a force multiplied by the velocity with which it is acting, is the power in operation. Power is the differential of work or any action which produces work, whether mental or physical. Power multiplied by the time of action is work—work divided by time is power.

Work is the product obtained by multiplying together the three simple elements, force, velocity and time.

## SCIENTIFIC PROGRESS.

## Faraday's Electro-Chemical Researches.

The majority of Faraday's own researches were connected, directly or indirectly, with questions regarding the nature of electricity, and his most important and most renowned discoveries lay in this field. The facts which he has found are universally known. Nevertheless, the fundamental conceptions by which Faraday was led to these much admired discoveries have not been received with much consideration. His principal aim was to express in his new conceptions, only facts, with the least possible use of hypothetical substances and forces. This was really a progress in general scientific method, destined to purify science from the last remnants of metaphysics. Now that the mathematical interpretation of Faraday's conceptions regarding the nature of electric and magnetic force has been given by Clerk Maxwell, we see how great a degree of exactness and precision was really hidden behind his words, which to his contemporaries appeared so vague or obscure; and it is astonishing in the highest degree to see what a large number of general theories, the methodical deduction of which requires the highest powers of mathematical analysis, he has found, by a kind of intuition, with the security of instinct, without the help of a single mathematical formula.

The electrical researches of Faraday, although embracing a great number of apparently minute and disconnected questions, all of which he has treated with the same careful attention and conscientiousness, are really always aiming at two fundamental problems of natural philosophy: the one more regarding the nature of physical forces, or of forces working at a distance; the other, in the same way, regarding chemical forces, or those which act from molecule to molecule, and the relation between these and the first.

The great fundamental problem which Faraday called up anew for discussion was the existence of forces working directly at a distance without any intervening medium.—*Prof. Helmholtz, in Popular Science Monthly for June*.

LATE OBSERVATIONS ON JUPITER.—From seven years' observation of the surface of Jupiter, Herr Bredichin concludes that the inequalities in the angular velocity of the different figures seen on the planet may possibly be explained by assuming (1) that in the neighborhood of the equator there is a solid, elevated zone, which, however, does not rise beyond the limits of the atmosphere, and (2) that the crust of the southern hemisphere transmits more internal heat into the atmosphere than that of the northern, and this affects the direction of currents of gases and vapors passing from one hemisphere to the other. The phenomena observed in that part of the crust which appears through the vaporous layer as a red spot prove, he says, the considerably deeper position of this spot as compared with the equatorial zone, and the preponderating heat development on the southern part of Jupiter. Herr Bredichin gives the distances of the southern and northern borders of the elevated equatorial zone from the equator, for the years 1874 to 1880, and he finds that the equatorial zone must be steeper to the south, while it has a more gentle fall to the north, so that here it is varying, and covered more or less with clouds and vapors. The highest strip of this zone seems to be 2" from the equator, on the north.

BRAIN SUBSTANCE.—When brain substance is placed in alcohol, it loses its water and mobility of particles, and becomes more solid and firm. The question here arises: Is this thing possible with the living brain? Is it possible (asks the *Popular Science Monthly*), that, in cases of delirium tremens, so much alcohol has been consumed, that by its diffusion through the brain it has robbed nerve matter of its mobile character, and consequently of its power to throw off the products of its life functions? That alcohol may in this way act on the brain of the inebriate is an opinion which, as yet, can hardly be demonstrated directly, but experiments made, seem to render it highly probable. Brain substance, derived from an ox, was placed in a diluted solution of alcohol at the temperature of the blood, viz.: 100° F. When the liquid was drawn out after a few hours, and filtered, the filtrate threw down a white deposit of matter which the alcohol had dissolved out of the brain.

AN ACCIDENTAL DISCOVERY.—At a Berlin feather dyeing establishment an ostrich feather dyed in shades with methyl-violet was laid upon a paper upon which some ammonia had been poured but had dried up again. After a time the feather became partially green, the green passing gradually into violet, and producing an extraordinary effect. This reaction is being utilized in feather dyeing, and will probably be applied in the manufacture of artificial flowers.

An ingenious device for circumventing the practice of forgery has been invented. It consists of a chemically prepared cheese, printed in ink of two colors, of such constituents that if an alkaline solvent is used, one color will disappear; if an acid solvent is used, the other will disappear, and so mutilate the paper that detection will be inevitable.

THE ELECTRICITY OF ATOMS.—The most novel conclusion of Prof. Helmholtz, in his recent Faraday lecture, is to the effect that the atom of every chemical element is always united with a definite unvarying quantity of electricity. This quantity stands in close connection with the combining power of the atom which modern chemistry has termed valence. For if the amount of electricity belonging to the monad atom be taken as the unit, then that of the dyad is two, that of the triad three, and so on. "If," says Prof. Helmholtz, "we conclude from the facts that every unit of affinity of every atom is charged always with one equivalent, either of positive or negative electricity, they can form compounds, being electrically neutral, only if every unit charged positively unite under the influence of a mighty electric attraction with another unit charged negatively. You will see that this ought to produce compounds in which every unit of affinity of every atom is connected with one—and only with one—other unit of another atom. This is, indeed, the modern chemical theory of quivalence, comprising all the saturated compounds."

THE NOISE OF THE FINGER.—In a late number of the *Medical Record* Dr. Hammond says that when you poke the end of your finger in your ear, the roaring noise you hear is the sound of the circulation in your finger, which is a fact, as any one can demonstrate for himself by first putting his fingers in his ears and then stopping them up with other substance. Try it, and think what a wonder of a machine your body is, that even the points of your fingers are such busy workshops that they roar like a small Niagara. The roaring is probably more than the noise of the circulation of the blood. It is the voice of all the vital processes together—the tearing down and building up processes that are always going forward in every living body, from conception to death.

FOR THE MICROSCOPE.—M. Certe has lately found a method of coloring infusoria and anatomical elements during life. Placed in a weak solution of choline blue or cyanine, infusoria are colored pale blue, and many continue to live 25, and even 36 hours. Strong doses poison immediately. Again, after being 24 hours in a moist chamber, the white blood corpuscles of a frog colored with cyanine show amoeboid movements. The cyanine should here be dissolved in serum. Choline blue is, *par excellence*, the reagent of fatty matter. By affecting the cellular and not the nuclear protoplasm in infusoria, it shows fatty matters to exist only in the former. It should prove a useful means of studying cellular life.

FIRE-DAMP EXPLOSIONS.—Recent experiments of M. Michel Rossi tend to prove that explosions of fire-damp are preceded by light micro-seismic disturbances and faint subterranean noises, which the microphone detects with great sensibility. M. Rossi therefore suggests that local meteorological observatories should be established at collieries, and the microphone added to their ordinary equipment. The grating sounds by which this instrument indicates an escape of gas, together with the observations of temperature and pressure given by the thermometers and barometers would, he argues, go far to forewarn the superintendents of the mines, and thus prevent explosions.

THE CAMERA IN FORGERY.—It is stated that the bank of France has almost entirely abandoned chemical tests in favor of the camera for detecting forgeries. The sensitive plate not only proclaims forthwith the doing of the eraser or penknife, but frequently shows, under the bold figures of the forger, the sum originally borne by the check. So ready is the camera to detect ink marks that a *carte-de-visite* inclosed in a letter may to the eye appear without blemish, while a copy of it in the camera will probably exhibit traces of writing across the face, where it has merely been in contact with the written page.

THE death is reported of Mr. F. A. Nobert, the celebrated producer of test plates for microscopists. He had been engaged for many years in ruling micrometers and diffraction plates, and produced one set of lines—his nineteenth hand—equivalent to about 112,000 lines to the inch, which he believed could never be seen resolved in the microscope. Dr. Woodward eventually produced photographs of the finest of these lines; when Mr. Nobert ruled a new plate, the finest band of which—the twentieth—was of a fineness equivalent to about 224,000 lines to the inch.

A SCIENTIST in the *Magazine of Pharmacy*, asserts that the usual physico-chemical methods for determining the potable nature of water have proved themselves to be quite insufficient, and he says that "recourse must be had to the microscope and to the culture-glasses used by physiologists in their inoculation experiments before any really sound and valuable knowledge can be gained by the examination of waters" as to their purity or impurity.

NEW ARTIFICIAL MINERAL.—During fires in coal mines, various substances have been found to be formed. Among them, at Commentry, M. Desbreaux has discovered a new magnetic mineral which contains phosphorus and small quantities of arsenic and sulphur. This substance resembles various natural minerals and some meteoric stones. A similar substance is found in veins of silicate containing vivianite.



Table of Highest and Lowest-Sales in  
S. F. Stock Exchange.

Name of Company.	Week Ending May 19.	Week Ending May 26.	Week Ending June 2.	Week Ending June 9.
Alpha.....	3.30	3.15	3.1	2.90
Alta.....	3.55	3.30	3.35	3.40
Andes.....	2.10	1.90	2.10	2.2
Albion.....	3.30	2.80	3.60	3.55
Argenta.....	4.00	3.50	3.50	3.20
Arizona.....	2.50	2.65	2.00	2.15
Bellmont.....	2.95	2.65	2.00	2.15
Belcher.....	65c	60c	75c	65c
Bell & Belcher.....	12	10	15	11
Bullion.....	95c	75c	70c	60c
Bush.....	60c	70c	60c	1.05
Belle Isle.....	45c	45c	45c	45c
Bodie.....	90c	80c	65c	75c
Benton.....	3.05	3	3	3
Boston.....	50c	50c	40c	60c
Black Hawk.....	25c	20c	20c	20c
Belviders.....	40c	40c	40c	40c
Booker.....	30c	20c	25c	20c
California.....	1.35	1.10	1.15	1.20
Challenger.....	80c	2.60	1.50	1.30
Chollar.....	3.60	3.40	3.50	4.40
Con Imperial.....	2.40	1.0c	2.50	2.50
Con Virginia.....	2.45	2.30	2.45	2.35
Crown Point.....	2.70	2.45	1.65	2.20
Champion.....	1.70	1.70	1.70	1.70
Concordia.....	80c	25c	40c	35c
Con Pacific.....	1	75c	1.10	1.45
Deer Creek.....	1	75c	1.10	1.45
E. M. Diabolo.....	35	31	33	31
Eureka.....	1.40	1.35	1.15	1.30
Excelsior.....	80c	75c	60c	45c
Golden Gate.....	1.95	1.90	2.15	2.05
Goldfield.....	55c	60c	55c	50c
Head & Norcross.....	4.50	4.60	4.1	3.85
Head Center.....	2	12	12	12
Hussey.....	1.10	1	1	1
Independence.....	1.20	1	1	1
Justice.....	1.10	1	1	1
Jackson.....	30c	20c	40c	35c
Jupiter.....	25	21	20	21
Kentucky.....	25	21	20	21
Kosuth.....	15c	15c	15c	15c
Lady Bryan.....	20c	10c	20c	25c
Lady Wash.....	20c	10c	20c	25c
Leviathan.....	1.60	1.60	1.60	1.60
Leadville.....	30c	30c	30c	30c
May Belle.....	21	21	21	21
Modoc.....	1.10	1.10	1.10	1.10
Manhattan.....	1.60	1.60	1.60	1.60
Martin White.....	30c	30c	30c	30c
McClintock.....	21	21	21	21
Mexican.....	1.10	1.10	1.10	1.10
Montezuma.....	50	50	50	50
North Belle.....	1.10	1.10	1.10	1.10
North Standard.....	1.10	1.10	1.10	1.10
Oakland G. & S. M. Co.....	1.10	1.10	1.10	1.10
Oakland G. M. Co.....	1.10	1.10	1.10	1.10
Prospect G. & S. M. Co.....	1.10	1.10	1.10	1.10
Red Hill Hydraulic M. Co.....	1.10	1.10	1.10	1.10
Silver City M. Co.....	1.10	1.10	1.10	1.10
Three Brothers S. M. Co.....	1.10	1.10	1.10	1.10
Union Gravel M. Co.....	1.10	1.10	1.10	1.10
Wolfram Gravel M. Co.....	1.10	1.10	1.10	1.10
Wide Awake M. Co.....	1.10	1.10	1.10	1.10
Albion.....	1.10	1.10	1.10	1.10
Alta.....	1.10	1.10	1.10	1.10
Andes.....	1.10	1.10	1.10	1.10
Albion.....	1.10	1.10	1.10	1.10
Argenta.....	1.10	1.10	1.10	1.10
Arizona.....	1.10	1.10	1.10	1.10
Bellmont.....	1.10	1.10	1.10	1.10
Belcher.....	1.10	1.10	1.10	1.10
Bell & Belcher.....	1.10	1.10	1.10	1.10
Bullion.....	1.10	1.10	1.10	1.10
Bush.....	1.10	1.10	1.10	1.10
Belle Isle.....	1.10	1.10	1.10	1.10
Bodie.....	1.10	1.10	1.10	1.10
Benton.....	1.10	1.10	1.10	1.10
Boston.....	1.10	1.10	1.10	1.10
Black Hawk.....	1.10	1.10	1.10	1.10
Belviders.....	1.10	1.10	1.10	1.10
Booker.....	1.10	1.10	1.10	1.10
California.....	1.10	1.10	1.10	1.10
Challenger.....	1.10	1.10	1.10	1.10
Chollar.....	1.10	1.10	1.10	1.10
Con Imperial.....	1.10	1.10	1.10	1.10
Con Virginia.....	1.10	1.10	1.10	1.10
Crown Point.....	1.10	1.10	1.10	1.10
Champion.....	1.10	1.10	1.10	1.10
Concordia.....	1.10	1.10	1.10	1.10
Con Pacific.....	1.10	1.10	1.10	1.10
Deer Creek.....	1.10	1.10	1.10	1.10
E. M. Diabolo.....	1.10	1.10	1.10	1.10
Eureka.....	1.10	1.10	1.10	1.10
Excelsior.....	1.10	1.10	1.10	1.10
Golden Gate.....	1.10	1.10	1.10	1.10
Goldfield.....	1.10	1.10	1.10	1.10
Head & Norcross.....	1.10	1.10	1.10	1.10
Head Center.....	1.10	1.10	1.10	1.10
Hussey.....	1.10	1.10	1.10	1.10
Independence.....	1.10	1.10	1.10	1.10
Justice.....	1.10	1.10	1.10	1.10
Jackson.....	1.10	1.10	1.10	1.10
Jupiter.....	1.10	1.10	1.10	1.10
Kentucky.....	1.10	1.10	1.10	1.10
Kosuth.....	1.10	1.10	1.10	1.10
Lady Bryan.....	1.10	1.10	1.10	1.10
Lady Wash.....	1.10	1.10	1.10	1.10
Leviathan.....	1.10	1.10	1.10	1.10
Leadville.....	1.10	1.10	1.10	1.10
May Belle.....	1.10	1.10	1.10	1.10
Modoc.....	1.10	1.10	1.10	1.10
Manhattan.....	1.10	1.10	1.10	1.10
Martin White.....	1.10	1.10	1.10	1.10
McClintock.....	1.10	1.10	1.10	1.10
Mexican.....	1.10	1.10	1.10	1.10
Montezuma.....	1.10	1.10	1.10	1.10
North Belle.....	1.10	1.10	1.10	1.10
North Standard.....	1.10	1.10	1.10	1.10
Oakland G. & S. M. Co.....	1.10	1.10	1.10	1.10
Oakland G. M. Co.....	1.10	1.10	1.10	1.10
Prospect G. & S. M. Co.....	1.10	1.10	1.10	1.10
Red Hill Hydraulic M. Co.....	1.10	1.10	1.10	1.10
Silver City M. Co.....	1.10	1.10	1.10	1.10
Three Brothers S. M. Co.....	1.10	1.10	1.10	1.10
Union Gravel M. Co.....	1.10	1.10	1.10	1.10
Wolfram Gravel M. Co.....	1.10	1.10	1.10	1.10
Wide Awake M. Co.....	1.10	1.10	1.10	1.10

## Sales at S. F. Stock Exchange.

Thursday A. M., June 9.	13350	Trojan.....	20c
170 Alpha.....	150	Union.....	14c
1890 Alta.....	410	Utah.....	11c
145 Andes.....	2.40	Yellow Jacket.....	6c
550 Belcher.....	3.80	Afternoon session.	
250 B. & Belcher.....	450	Nebraska.....	32c
660 Bullion.....	1.05	100 Bulwer.....	2.85
2620 Benton.....	95c	60 Bodie.....	7c
1035 Con Virginia.....	4.60	100 Bechtel.....	95c
50 Golden Gate.....	2.10	100 Black Hawk.....	20c
180 Chollar.....	60c	100 Bodie.....	7c
690 Crown Point.....	3.40	700 Day.....	1.30
3780 Con Imperial.....	25c	80 E. M. Diabolo.....	15c
100 Confidence.....	4.90	200 Endowment.....	5c
100 Challenge.....	55c	550 Goodshay.....	2c
170 California.....	60c	180 Head Center.....	15c
100 Capital.....	1.15	300 Holmes.....	25c
610 Excelsior.....	1.50	315 Manhattan.....	2c
60 Golden Gate.....	2.85	100 Mammoth.....	15c
270 Gold & Curry.....	30c	300 Mono.....	1c
490 Hale & Norcross.....	4.40	30 M. Diabolo.....	9c
200 Julia.....	65c	300 N. Belle.....	30c
1225 Justice.....	1.60	100 Northern Belle.....	23c
240 Kentucky.....	2.60	100 Noonday.....	1.85
980 Lady Wash.....	25c	400 N. Noonday.....	1.15
260 Mexican.....	13c	775 Oro.....	60c
500 New York.....	20c	250 Queen Bee.....	10c
350 N. Ex. Utah.....	1.20	100 Syndicate.....	40c
380 Ophir.....	80	400 S. Bodie.....	15c
630 Overman.....	1.70	100 Silver King.....	32c
100 Occidental.....	1.10	160 Sulphur.....	3.35
520 Potomac.....	3.90	100 Tranquillity.....	2.60
340 Savage.....	1.20	120 Toga Con.....	45c
510 Sierra Nevada.....	1.60	650 Tip-top.....	25c
400 Silver Hill.....	50c	100 Tuscarora.....	25c
650 Spaulding.....	2.15	100 University.....	10c
100 Sierra.....	1.10	600 Wedge Con.....	10c
50 Solid Silver.....	45c	620 Wales.....	11c

CONTRIBUTIONS TO THE GEOLOGY OF CALIFORNIA.—We begin this week a series of articles on this subject from the pen of Prof. W. P. Blake, a gentleman too well known to the mining community to need any introduction by us. The first paragraph of the contribution explains why the articles were written. We are very glad to be able to publish them, and can congratulate the miners of the coast on the fact that Prof. Blake has consented to write them. We shall have more to say on this subject in our next issue.

AWARDS TO INVENTORS.—The Board of Managers of the Sixteenth Industrial Exhibition have decided to award only Institute and Inventor's medals to exhibitors. The fair will open August 2d.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.									
COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.		
Belle Isle M Co	Nevada	2	15	June 3	July 11	E M Hall	327 Pine st		
Bullion M Co	Nevada	19	60	May 19	June 22	J M Brazier	328 Montgomery st		
Bullion M Co	Nevada	19	60	May 19	June 22	J M Brazier	310 Pine st		
Caledonia M Co	California	35	25	May 27	June 7	R Wegener	419 California st		
Con Imperial M Co	Nevada	15	10	Apr 18	May 4	W E Dean	309 Montgomery st		
Equitable T & M Co	Utah	25	15	May 10	June 17	C J Collins	612 Montgomery st		
Equator M Co	Nevada	4	25	June 7	July 12	W W Wills	303 Montgomery st		
Fresno G M Co	California	2	15	Apr 25	June 1	D Buck	309 Montgomery st		
Grand Prize M Co	Nevada	5	25	May 27	June 30	E M Hale	327 Pine st		
Hale & Norcross M Co	Nevada	69	60	May 10	June 15	J F Lightner	309 Montgomery st		
Julia Con M Co	Nevada	15	30	Apr 27	June 2	H A Charles	419 California st		
Kentuck M Co	Nevada	15	30	May 19	June 23	J C Stuart	310 Pine st		
Lady Washington M Co	Nevada	2	15	Apr 15	May 20	W H Watson	302 Montgomery st		
Mammoth M Co	California	8	25	Apr 13	May 7	A W Rose Jr	302 Montgomery st		
Mt Potomac M Co	Nevada	6	25	Apr 6	May 13	E A Holmes	318 Pine st		
Mono G M Co	California	12	50	May 19	June 24	W H Lent	309 Montgomery st		
Oro M Co	California	10	10	June 1	July 5	W Starn	320 Sansome st		
Paradise Valley M Co	Nevada	2	07	Apr 8	May 13	Wm Letts Oliver	328 Montgomery st		
Phoenix M Co	Nevada	23	10	May 9	June 15	H Loefer	308 California		
Sierra Nevada S M Co	Nevada	16	25	May 7	June 10	W E Dean	309 Montgomery st		
Tioga Con M Co	California	13	15	May 11	June 15	E F Porter	309 Montgomery st		
Yellow Jacket S M Co	Nevada	4	100	May 9	June 14	W H Lent	309 Montgomery st		

## OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Arizona's Mexican M Co	Arizona	1	50	June 7	July 15	G R Adams	320 Sansome st
Benton Con M Co	California	5	25	May 21	June 24	W H Watson	302 Montgomery st
Boston Con M Co	California	1	30	Apr 26	May 1	F E Lutz	330 Pine st
Butte Creek H M Co	California	7	10	Apr 21	May 26	R L Taylor	230 Montgomery st
Day Silver M Co	California	8	10	May 16	June 3	J M Wills	522 Montgomery st
Excelsior Deep Gravel M Co	California	16	25	May 25	June 27	T Wetzel	327 Pine st
Fresno Enterprise M Co	California	1	15	June 1	July 1	D B Chisholm	306 Pine st
Gold Lead M Co	Nevada	2	10	Apr 5	May 20	W H Allen	331 Montgomery st
Golden Gate Con M Co	California	3	100	Apr 14	May 25	D Franklades	318 Pine st
Iowa M Co	Nevada	13	06	Apr 23	May 30	J F McGowan	411 California st
Iron Clad Con M Co	California	1	11	May 25	June 10	Chas C Leavitt	309 Montgomery st
Lodi M Co	Nevada	2	10	Apr 22	May 26	A Dett	328 Montgomery st
Lord of Lorn G M Co	California	1	15	Apr 19	May 31	R N Paul	318 Pine st
Mammoth M Co	California	1	20	Jan 12	Feb 27	R N Van Brunt	328 Montgomery st
North Standard G & S M Co	California	1	10	Apr 25	June 1	J Morio	310 Pine st
Oakland G M Co	California	15	06	May 3	June 2	C Van Dyck Hubbard	436 Montgomery st
Prospect G & S M Co	Nevada	8	10	Apr 26	May 31	R D Hopkins	451 California st
Red Hill Hydraulic M Co	California	4	15	May 10	June 23	H P Bush	223 Montgomery st
Silver City M Co	Nevada	2	10	Apr 23	May 27	Chas C Leavitt	323 Montgomery st
Three Brothers S M Co	Arizona	1	30	May 25	June 28	A B Paul	309 Montgomery st
Union Gravel M Co	California	17	50	May 17	June 15	C Meade	324 Pine st
Wolverine Gravel M Co	California	2	10	May 31	June 1	E J Blanning	325 Front st
Wide Awake M Co	Arizona	13	10	June 4	July 18	F J Branding	325 Front st
						C Hildbrandt	11Cor Bush & Monty



Of the late run of the mill by Messrs. Pheby & Anthony be reports the following: Some 300 tons of ore were worked, about 100 tons of the Hemlock, 100 tons from Wyoming, and the balance from chert. On the 20th ult. the mill shipped 6 bars of bullion weighing 355 lbs., 850 fine, and on the 27th 4 bars weighing 323 lbs., 900 fine. Mr. Robinson came in after quicksilver, and having secured about a ton, will return with it in time to complete the present run.

**BEAVERDICK DISTRICT.**—It is stated that the new trail being built by Mr. Hunter and the mill and mine, 1000 from Juncos camp to Taylor, McKoy & Co.'s mill in Freestone canyon, will be completed next Monday. It comes a distance of 4 miles, and descends altogether from the mine to the mill about 4,000 ft., over one of the roughest regions outside of the moon. To get the auriferous quartz to the mill will require about 40 mules, to supply the requisite 9 tons to keep the little 5-stamp mill in operation day and night. The owners of the Key Note have contracted to supply at least 250 tons of ore for the first run.

**AT CARRO GORDO.**—Mr. Geo. Center, formerly superintending smelter at the Union Con. works, has lately been studying up the property with a view to leasing and starting up work. We understand that he is ready to go ahead provided the company will make certain connections from the 900 level to the new shaft to the old works, which it is to be hoped they will do.

## NEVADA.

**EAOLE MINE.**—*Nevada Transcript*, June 2: To-day the steam hoisting and pumping works just erected by W. H. Smith, the grocer, on the Eagle quartz mine, at Gallows Flat, adjoining the city limits on the east, will be regularly started up. The machinery has a capacity to sink 500 ft., and is the largest of its kind in the State. The incline, which is already down 74 ft. on the ledge, will be sunk 100 ft. more, at which point levels will be run. The ledge is about 6 inches thick in the bottom of the incline, and is increasing in size as it descends. This claim was discovered in 1855, and since then has been worked irregularly by various parties who have altogether taken out \$30,000 within 80 ft. from the surface, some of the explorations being made by tunnel. Within the last two years the results have been especially encouraging. 25 tons taken from the incline and vicinity, paying \$1,230. Eleven tons more taken out within 20 ft. of the bottom of the incline yielded \$604, while 11 tons from a back ledge in the same locality paid \$303. The mint certificates verify these figures. Mr. Smith, who recently purchased this property, has had his eye on it for a long time. Years ago, when engaged in hauling quartz for other mine owners, he saw an excellent opportunity to put himself as to its merits. He proposed to work it on the same principle that he conducted his store business.

**PEARL CON.**—*Nevada Transcript*, June 4: The Pearl Con. M. Co. of this city, whose claim is on the South Yuba 4 miles north of here and a short distance below Kirkham & Hitchcock's quartz mine, have after several months of prospecting in a quiet way made some developments that promise to be permanent and profitable. The east drift from the bottom of the main tunnel, which is in a distance of 131 ft. and is 300 ft. below the croppings of the ledge and 700 ft. below the brow of the mountain, has in the course of its progress opened on to some very fine sub-uptore. Fifteen ft. after leaving the tunnel it passes through the first vein of gold-bearing quartz. This deposit is of low grade, but would probably pay for working. Thirty ft. in another pay streak is encountered that assays in the neighborhood of \$200 ton in gold. At 45 ft. a splendid vein is encountered. Among the assays one ore at the rate of \$24 a ton in silver and \$5 a ton in gold. The drift is in quartz all the way, being on the foot wall. The ledge is clearly defined, about 7 ft. thick, and on the dividing line between granite and slate. The Pearl Con. is a local incorporation, the stockholders being well-known business men and miners who are paying for the work by voluntary contributions instead of by the usual assessment plan.

## PLACER.

**REDSTONE.**—*Placer Times*, May 23: The Redstone quartz mine is looking very promising just now. The prospect for something big becomes more encouraging as the work progresses. The owners have one of the new Huntington oscillating crushers in which the quartz is crushed. Last week a lot of seven tons of the ore from their claim was run through the mill and a clean-up made, from which it is reported that \$600 of gold was realized. This encourages them to go ahead. The location of the Redstone is in Little Bear valley, near Towle Bros.' upper sawmill, about 12 miles from Dutch Flat. In that vicinity we are informed extensive quartz ledges are traceable on the surface of the ground, but heretofore they were thought to be worthless and no notice was taken of them. The Redstone claim is owned by Messrs. John Leiber, Bart. Allen and Dave Driscoll, all of whom came from Oakland.

**RISING SUN.**—*Placer Herald*, June 4: At the Rising Sun mine, at Colfax, which runs nrauks among the solid mining enterprises of the country, a great deal of work is being carried on. Fourteen or fifteen months ago this mine was purchased by New York parties, and in about 12 months they have increased the production of the mine in excess, we understand, of the cost of the mine. Encouraged by this flattering result, they concluded to increase the capacity of their mill and make other improvements. The mill, which contained 10 stamps, has been increased to 20. The engine is being replaced by a new and larger one; self-feeders will be put in, another pair of Eucre rubbers will be added, and the concentrating machinery will be increased in proportion to the increased capacity of the mill. The pumping engine is also to be replaced by a larger engine. In order that there may be no doubt about keeping the 20 stamps employed, a new hoisting shaft is being sunk on the ledge some 800 ft. west of the present works. This shaft is now down a little more than 100 ft. At that depth the vein is from 2 1/2 to 3 ft. and the rock looks very well. A fine building and steam hoisting shaft will be put on this new shaft at once. The work of putting up these additions, making these changes and repairs, is being done under the direct supervision of Mr. J. K. Gwens, a millwright whose work speaks his ability. Supt. Wm. Werry, to whose experience and good management much of the success of the new company is due, hopes to complete these extensive changes and commence crushing again by the 15th of this month. In the mine this 900 level is under water in consequence of interruption to the pumping machinery, made necessary by the changes. In a drift on the 500 level some very rich ore has been struck east of what is supposed to be the regular pay chute. It seems to be something new, and is regarded by Supt. Werry as a very important development. When they start up again, with the improved appliances and increased machinery, Mr. Werry hopes to take out from \$10,000 to \$15,000 a month over and above expenses.

## PLUMAS.

**GENESSE HILL CLAIM.**—*Plumas National*, June 4: Wils. Dean writes us that he has run a prospect tunnel on the Genesee hill claim, and has got the bottom. He struck gravel the first day, and finds the channel 40 ft. wide, with gold all through the drift. This insures a good piling claim, and as soon as the pipe arrives he will make things lively. At present he is ground sluicing, and he regards his prospects as very encouraging.

## SHASTA.

**MAD OX MINE.**—*Shasta Courier*, June 4: The south lode or tunnel is in about 300 ft., drifting on the lode 200 ft. to the north, and 100 ft. to the south. The ledge in the tunnel is 8 ft. wide in the north end, and 14 ft. wide in the south, and is about 2 ft. wide in the raise. All of the ore in the raise and at both ends is good pay ore, yielding from \$18 to \$25 per ton. So far they have not taken any ore from the stope, which are very rich, but have been using all the ore they crush from the tunnel or main level. The Supt. calculates that this end of the mine will give them enough pay ore to run 6 years with a 5-stamp mill or 3 years with a 10-stamp mill. The mine is owned by J. Strode, O. P. Woodward and A. Grofeland. The extension to the Mad Ox mine is owned by Warfield, Solan,

Scott, McDonald & Co., and has paid its owners large dividends in the past. The company have been running new shafts after gold through the mine, and we returned to the mill. It is a 5-stamp mill, Laffell wheel, run by water-power, with 60 ft. of plate and a crushing capacity of 6 tons in 24 hours. The company talk of putting in 6 more stamps soon.

## SIERRA.

**HEAVY GOLD.**—*Mountain Messenger*, June 4: On Sunday last a piece of gold weighing 60 ounces was found in the dump of the Bald Mountain, at Forest city. This specimen is particularly fine looking, being something in the shape of a retort. The large end is almost round and as large as a small man's fist. Several pieces of 10, 12 and 15 ounces were taken out the same day. The large piece was discovered among the gravel before it was washed.

The Bald Mountain Extension Co. are putting up a large dump to hold their summer's gravel. One track is up and lumber is out for two more. From the bottom the last bent to the bottom of the sluices will be about 60 ft. The gravel in all the gangways looks better than it has yet appeared. Eleven men are working inside.

A late note—it will be about three weeks before the Alaska mill will be ready to begin crushing rock. The company is busy raising a shaft for air.

This Sierra Buttes quartz M. Co.'s dividend for April amounts to 25 cents a share, aggregating \$30,000; and that of the Plumas Eureka 75 cents, \$105,000. In this part of the State are many undeveloped quartz mines capable of being proved just as valuable and productive as those whose steady dividends of years have contributed not a little to the prosperity of the State.

**WATER.**—It will be several weeks yet before the Brush Creek mill will be free of water. The pumps are running steadily, and the water is slowly receding, but as they have got down to where there are some long drifts, it is necessarily slow work.

**BUILDING.**—The Bald Mountain Co. are busy putting up heavy timbers across their large dump, and otherwise preparing the summer's work. The timbers being used are extra heavy.

**PROF. BLAKE.**—Prof. Blake, the gentleman who reported on the Sierra Buttes quartz mine for the English company, which purchased it from the Reese Bros., was in town last week. He went over and examined the Extension Co.'s property, going up the ridge as far as American hill, taking in the University claims on the way. The Professor says the country goes up the ridge beyond a doubt, as he finds in the gravel formations that can be found nowhere in this section except above Sierra city.

## TUOLUMNE.

**MINE BONDED.**—*Union Democrat*, June 4: R. C. Davis, Joseph Cavanaugh, John D. Erickson and John Conley have agreed to sell the Continental and Sonnet mines by their extensions, to W. H. Buckley, of Ancona, Nevada, and Leonard Richardson, of New York, for \$75,000. Two thousand dollars was paid on signing the contract, the balance, 73,000, is payable within 90 days, or the amount paid will be forfeited. Another party offers to take the property and pay down for it. The mines are now being worked. The Continental is running 20 stamps, crushing 28 tons daily. Recent developments in the 3d, 3d and 4th levels show up a vein 10 ft. in thickness, all of which is good milling ore. The rock now being worked is from this vein, and pays regularly \$10 to \$12 per ton.

## NEVADA.

### WASHOE DISTRICT.

**UNION CON.**—*Enterprise*, June 5: On the 2500 level the joint Mexican winze has been sunk and timbered 12 ft., and the joint Sierra Nevada winze 15 ft.

**UNION SHAFT.**—During the week the shaft has been sunk and timbered 14 ft. The ground at the bottom is becoming somewhat softer. The west drift on the 400 level has been cleaned out and repaired a distance of 600 ft., and a drift started north from that point.

**NEW WELLS FARM.**—The work of boring the water from the shaft is progressing well. We are having a new tank constructed with a capacity of 270 gallons, which will be in use by Tuesday. We expect then to reach the 500 level in a few days.

**YELLOW JACKET.**—The water in the mine this morning is five ft. below the 2700 station. There is upwards of 35 inches of water coming into our mine on this level from the Imperial group of mines. We find all the drifts on the 2700 level in excellent condition. Not more than two car loads of ground has fallen from place throughout the level.

**SUBTUNNEL.**—Drain boxes covered since last report. 230 ft. total, 1700 ft. Single line of large drain boxes put in since last report, 320 ft.; total, 1,006 ft. Sills for large boxes put in since last report, 018 ft.; total, 1,125 ft. Sub-drain excavated since last report, 119 ft.; total, 1,219 ft. The sub-drain is now completed to the Combination connection, and 40 ft. beyond this point is being excavated for the purpose of putting in two boxes to allow us sufficient room for connection with the Combination and the Sierra Nevada south lateral drain boxes. The nature of the ground in the header is hard and timbering, and the character of the rock is andesite and vein porphyry. During the week we have covered 20 ft. of the south lateral drain boxes and placed in position 300 ft. of blower pipe. The drill carriage has been removed from the drift to the machine shop and is being cut down and repaired.

**CONSOLIDATED VIRGINIA.**—On the 2500 level the joint California east crosscut has been extended 27 ft., and the south drift hole 55 ft.

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**SUBTUNNEL.**—Drain boxes covered since last report. 230 ft. total, 1700 ft. Single line of large drain boxes put in since last report, 320 ft.; total, 1,006 ft. Sills for large boxes put in since last report, 018 ft.; total, 1,125 ft. Sub-drain excavated since last report, 119 ft.; total, 1,219 ft. The sub-drain is now completed to the Combination connection, and 40 ft. beyond this point is being excavated for the purpose of putting in two boxes to allow us sufficient room for connection with the Combination and the Sierra Nevada south lateral drain boxes. The nature of the ground in the header is hard and timbering, and the character of the rock is andesite and vein porphyry. During the week we have covered 20 ft. of the south lateral drain boxes and placed in position 300 ft. of blower pipe. The drill carriage has been removed from the drift to the machine shop and is being cut down and repaired.

**CONSOLIDATED VIRGINIA.**—On the 2500 level the joint California east crosscut has been extended 27 ft., and the south drift hole 55 ft.

**UTAH.**—During the past week the incline has been sunk and timbered 14 ft. The ground at the bottom is becoming somewhat softer. The west drift on the 400 level has been cleaned out and repaired a distance of 600 ft., and a drift started north from that point.

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This New York incorporation will not sell a share of the stock set aside to be sold to raise money with which to build a 10-stamp mill for less than \$1.50 per share; and will not sell any of their own at present at any price.

The Cortez, which belongs to another New York company, is increasing its force of miners every day as they can find room for them. They have their incline down now from the tunnel about 100 ft. in the ledge; have a double runway for their buckets, and everything running in good shape.

The Utah, owned by W. M. Seawell and Mr. G. W. Dorn, lies northeast of and adjoining the Cortez, on the same vein. After making surveys and a thorough examination of their tunnel and workings, they commenced work in their shaft, cleaning it out and having it timbered up in good shape. When this is completed they can commence at once to take out good ore.

The Centennial is looking and yielding about the same quality of ore as the Cortez report. They will commence crushing some in the little mill next week.

The New Emeralds.—Some Bodie mining men have been out to examine this property. They were very well pleased with the appearance of it, and took a good deal of the rock away with them to have it tested. A gentleman who visited this property lately says that the ledge, where crossed with the tunnel, is 70 ft. thick, although they are only claiming a width of 10 to 15 ft.

## I X L DISTRICT.

**BAFFIELD.**—*Cor. Silver State*, June 3: The Baffield Co. are down 200 ft., and are now drilling, having passed through a body of very hard line ore, assaying from \$30 to \$40 per ton. There are thousands of tons of this ore already in sight, the drift passing through a body of it for a distance of 40 ft. Not much else is being done on the east side, as parties seem to be waiting for further developments in the Baffield.

## PIKE HOLLOW DISTRICT.

**NEW DISTRICT.**—*Silver State*, June 3: I X L District is located on the divide of the Bull Creek range, while Pike Hollow has been organized as a new district on the west side. This district bids fair to be the better of the two. The Sweepstakes mine, owned by Messrs. Allen, Wightman & Co., is now down 50 ft. on a well-defined ledge from 2 to 6 ft. wide, of free milling ore, which assays from \$150 to \$600 per ton. It is the intention of this company to sink a 200 or 300-ft. shaft, run drifts and take out ore. Parties are at present from San Francisco looking out for a mill site, and say that a 5-stamp mill will be erected by Sept. 1st. The Gray Eagle and Little Wonder mines are located on the same ledge as the Sweepstakes, and are being prospecting with very flattering results.

## TUSCARORA DISTRICT.

**TUSCARORA M. & M. Co.**—*Times-Review*, June 2: Commenced drifting from the 100 level. Ledge from 1 to 2 ft. wide, carrying some good ore.

**INDREPENDENCE.**—Crosscut on 600 level extended 24 ft.; now in 103 ft.

**TUSCARORA TUNNEL.**—During the past week the tunnel has been extended 22 ft.; total, 23 ft. Ground works well.

**NORTH BELLE ISLE.**—The north upraise from the 150 level exposes fine ore in limited quantities. All other work in the mine is confined to stoping above the 150 level. The ledge is from a seam to 2 ft. thick. Ore high grade.

**BELLE ISLE.**—The north intermediate drift above the 250 level has been extended 10 ft.; total, 34 ft. The vein in this drift will average about 5 inches in width of good ore.

**ARONETA.**—Have started a raise from the 000 level, 112 ft. east of winze. The ledge is 18 inches wide, showing good ore.

**GRAND PRIZE.**—During the past week have been making some needed repairs in the shaft.

**NAVAGO.**



## An Injunction Against Hydraulic Mining.

The debris question has now assumed a shape which points to a more speedy solution than was anticipated. An action has been commenced by the People of the State of California, by A. L. Hart, its Attorney-General, against the Miocene M. Co., in the Superior Court of Sacramento county, where the complaint was filed. It is asked by the plaintiff that said mining company be enjoined and restrained perpetually from discharging or dumping into the Feather river, or causing or suffering to flow into said river any tailings from its lands or mine. The people will be represented in the action by Attorney-General A. L. Hart, J. H. Craddock and George Cadwalader and P. Van Clief, of counsel.

The Sacramento *Beaver* says the complaint is quite lengthy, covering 17 pages of printed matter. It commences by setting forth that the Sacramento and Feather rivers lie entirely within the limits of the State of California; that they are navigable streams and have been so declared to be by the Legislature; also, that the navigation of the Feather river has been seriously impaired by the deposit therein of tailings from the hydraulic mines. A description is then given of the manner in which hydraulic mining is conducted in the counties of Butte, Yuba, Sierra and Nevada, and it is represented that the tailings from all the hydraulic mines worked in those four counties are discharged into the Feather river and the streams tributary thereto; also, that a large portion thereof has been deposited and lodged in the bed and channel of the Feather river throughout its entire length below the town of Oroville, in Butte county, but a large portion thereof has been washed and carried by the water into and down the Sacramento river and deposited in the bed and channels of the last-named river throughout its entire length below its junction with said Feather river.

It is further set forth that prior to the month of February, 1881, and before the commission of the wrongful acts by the defendant herein-after complained of, the

### Deposit of Tailings

From the hydraulic mines, as aforesaid, in the beds and channels of said rivers had filled up and raised said beds and channels to a considerable extent in the lower portions of said rivers and to a much greater extent in the upper portion of the navigable part of said Feather river, and had greatly widened the beds of said rivers and shallowed the channels thereof, and thereby had considerably impaired and obstructed the navigation thereof, and had caused said rivers to overflow their banks and to submerge large portions of the adjacent lands—the property of citizens of this State—during the seasons of high water, and thereby interfered with and obstructed the free and comfortable use and enjoyment of said lands by the owners and occupants thereof, to a much greater extent than at any time before said rivers were so filled up, as aforesaid, by said tailings, and to a much greater extent than said lands would have been overflowed, or the use and enjoyment thereof would have been interfered with or obstructed had not said tailings been so deposited as aforesaid, in the beds and channels of said rivers.

### What the Defendant Has Done.

The complaint then goes on to recite that the defendant herein, the Miocene M. Co., is a corporation organized in the State of New York, under and by virtue of the laws of the State of New York, for the purpose of mining in Butte county of the State of California.

That prior to the month of February, 1881, said defendant acquired the possession of, and claims to own a large tract of mineral land, to-wit: About 1,500 acres, situate adjacent to said Feather river, on the north side thereof, about one mile above the said town of Oroville. The surface of said tract of land is generally about 200 ft. above the low-water level of said Feather river, and is susceptible of being worked and mined by said hydraulic process to a depth of about 30 ft. below the surface, and to that depth is composed of various strata of cement, gravel, pipe-clay and sand, the greater part of which, except the pipe-clay, containing small particles of gold.

That by means of a ditch and iron pipes, defendant has conducted to said mine a constant supply of 3,000 inches of water, which it is using, and will continue to use, under a vertical pressure of 350 ft., to mine its said tract of land by said hydraulic process, discharging the water through monitors, from nozzles of eight inches in diameter, and dumping all the tailings from such mining directly into said Feather river, immediately adjacent to said tract of mineral land.

That the defendant commenced to mine in said tract of land in the mode and by the process aforesaid, on or about the — day of February, 1881, and since that time has discharged and

### Dumped Into Said Feather River,

At a point adjacent to said tract of land, 12,000 cubic yards per day of solid material from said mine, composed of small boulders, cobble stones, gravel, sand and clay, during all the time it has so mined, and at that rate it will require over 20 years to mine out and exhaust said tract of land. And plaintiff further shows that the defendant, by its agents, has declared its intention, and really intends, to continue to mine said tract of land in the manner and at the rate aforesaid, and to discharge and dump the tailings from such mining ground into Feather river

as aforesaid, until said tract of land shall be mined out and exhausted, and will so continue to mine, and to discharge and dump said tailings into Feather river, unless enjoined and restrained by order of this honorable court. That the tailings discharged and dumped into Feather river by the defendant as aforesaid, have been washed and removed down said rivers by the natural force of the waters, and commingled with tailings from other hydraulic mines, and with them have been deposited and lodged in the beds and channels of said rivers and upon the lands adjacent to said rivers.

That since the defendant commenced to mine its said tract of land as aforesaid, the beds and channels of the Feather and Sacramento

### Rivers Have Been Filled Up.

Raised, widened and shallowed by the deposits therein of tailings from the defendant's mine, and other hydraulic mines as aforesaid, to a much greater extent than at any time before, and, by reason thereof, the navigation of said rivers has been impaired and obstructed, and the banks thereof and the lands adjacent thereto have been overflowed and injured to a much greater extent than at any time before the commencement of such mining by the defendant as aforesaid, and that by said mining and discharge of tailings into Feather river by the defendant as aforesaid, said defendant has largely and materially added and contributed to the said filling up, raising, widening and shallowing of the beds and channels of said rivers, and to the impairment and obstruction of the navigation of said rivers, and also to the said excessive overflow of the banks and lands adjacent to said rivers, to the great injury of said lands, and to the damage, discomfort and intolerable annoyance of the owners of said lands, and the residents thereon.

After alluding to the fact that the greater the depth of the water flowing the greater is its

### Force and Power to Scour Out

And carry off the deposits in a river, the complaint goes on to recite that the river beds have already become so much filled up and widened by the tailings from the hydraulic mines, including those of the defendant, that the depth of the water therein has been thereby greatly diminished, especially during the high stages of the water, when the water overflows the banks of said rivers and spreads over large tracts of land on each side of said rivers, instead of being confined within the natural banks, as it would have been but for said deposits therein from the hydraulic mines. That by reason of the diminution of the depth of the water in the beds and channels of said rivers, they will hereafter be filled up and the navigation thereof obstructed much more rapidly in proportion to the quantity of hydraulic tailings deposited therein than formerly, when their waters had greater depth and greater purity, and consequently more power to scour out and carry off such deposits. That a continuance of the deposits of tailings from the hydraulic mines, including that of defendant, during the next two years, at one half the rate they have been deposited for the last two years, will totally destroy the navigability of said Feather river, and further obstruct and impair that of the Sacramento river, and will submerge and

### Render Unfit for Cultivation

Or habitation all the bottom and other lowlands adjacent to said rivers, on both sides thereof, by the overflow thereof and the deposits thereon of sand and gravel from said hydraulic mines to such depth as to render said lands unproductive and valueless. That more than 50,000 acres of such lands of first-rate quality, and of great value, have already been so overflowed and covered by a deposit of sand and tailings from said hydraulic mines, to which the tailings from said mine of the defendant has largely and materially contributed, to a depth of from 1 ft. to 15 ft., and have thereby been rendered totally unfit for cultivation or any other useful purpose, and of no value whatever. That there are in the valley of said Feather river, below Oroville and within reach of its overflowing waters, over 100,000 acres of valuable agricultural lands—the property of citizens of this State—highly improved and cultivated, which remain uninjured, or injured only in a small degree by the overflow thereof and deposits thereon, of tailings from said hydraulic mines, but which will be subject to such overflow and deposits thereon, and which will be overflowed by water and covered by a deposit of tailings from said hydraulic mines, including that of the defendant, and thereby greatly deteriorated in value and usefulness to the owners thereof, if not rendered totally useless and of no value whatever, within a very short period of time, if hydraulic mining be continued by the defendant and others, as at present conducted; and plaintiff is informed and believes, and upon such information and belief alleges, that unless restrained and enjoined by this Honorable Court, such hydraulic mining will be so continued by defendant and others during the next 20 years, to the utter and total destruction of all the agricultural lands and the improvements thereon, and of all the cities and towns within the valley of Feather river, and within the valley of the Sacramento river below the town of Princeton, in Colusa county.

### Fouling the Waters.

Plaintiff further shows that the discharge and deposit of tailings by defendant from its mine so fouls and adulterates the waters of the Feather river at all points below defendant's mine, and down to the junction of the Yuba river, as to render the waters unfit for any use by the in-

habitants of said valley, and that in the absence of such fouling and adulterations, the waters were and still would be of first rate quality for all purposes for which water is used by man and beast.

It is then set forth that the filling up of the beds of the Feather and Sacramento rivers by tailings from the hydraulic mines of defendant and others has resulted in the great obstruction of the natural and artificial drainage of the lands, and the sewerage of the cities and towns in the Feather river and Sacramento valleys, and thereby said valleys have been rendered more unhealthy to the inhabitants thereof than they otherwise would have been, and will thereby continue to be rendered still more unhealthy by the continuance of hydraulic mining as conducted by defendant and others.

It is further set out that if hydraulic mining by defendant and others is stopped and not again resumed, that the waters of said rivers will at once commence to scour and carry off the tailings heretofore deposited therein, and within a few years will thereby restore said rivers to their former and normal conditions of navigability, deep channels and pure water.

### Why the Action was Brought Here.

Plaintiff further states that the wrongful acts of the defendant constitute a public nuisance of a continuously recurring nature, produced and continued by repeated wrongful acts of defendant, and not subject to abatement, but that the only appropriate or adequate remedy for which is by injunction from a court of equity, and for which there is no remedy at law except by information or indictment, as for a misdemeanor, the penalty of which is, and will be, totally inadequate to suppress the wrong; besides, such misdemeanor must be prosecuted in the county where it is committed, and is there triable by a jury, where it would be difficult, and generally impossible to convict the offender, by reason of the great influence of those generally guilty of the offense, and from a fact that a majority of the people in those counties where the offense is committed regard the wrongful acts herein above complained of as constituting no public offense. That the prospect of real and speculative profits from hydraulic mining, as herein above described and complained of, is generally such that persons engaged in it would suffer all the prosecutions and penalties of the law that could be inflicted upon them, rather than discontinue the commission of the offense; besides numerous and repeated prosecutions of each offender would be necessary to produce any effect whatever.

It is further set out that the navigability of said Sacramento and Feather rivers, and the value and usefulness of the agricultural lands of said valleys, and the roads and highways therein, are in imminent danger of total and irretrievable destruction by the wrongful acts of defendant, above complained of, and that such destruction can only be prevented by the writ of injunction from a court of equity.

Also, that if the wrongful acts of defendant and others, above complained of, are continued, the beds and channels of the upper portions of said rivers will very soon be filled and choked up by tailings from defendant's and other hydraulic mines; that said rivers will be turned from their natural beds and channels and spread and run at random over the entire valleys, in which condition the depth of their waters will be so diminished that they will have no force or power to scour said channels or to carry off the tailings deposited therein as aforesaid, and said valleys will become dismal swamps.

### What is Asked For.

In conclusion, the plaintiff prays that during the pendency of this action the defendant and all its officers, agents and employees may be restrained from discharging or dumping into said Feather river, or causing or suffering to flow into said river any tailings, boulders, cobble stones, gravel, sand, clay, debris or refuse matter from its said tract of mineral land, mine or elsewhere; and that upon the final hearing and trial of this action the said defendant may be so enjoined and restrained perpetually, and that plaintiff recover the costs of suit herein.

The complaint is subscribed and sworn to by S. E. Wilson, who has resided for the last 12 years on the northwest bank of the Feather river, nearly midway between Yuba City and its mouth, in Sutter county.

### The Injunction Issued.

In accordance with the petition of the plaintiff in the case, the injunction was issued by Judge Denson and served at once upon the mining company. As a result of this a number of miners have been discharged from some of the leading hydraulic mines, as will be seen by an article in another column of this number.

COMPOUND steel shafting is now made in Boston. An ordinary round steel shaft is made to pass through a peculiarly devised circular die, which compresses but does not elongate the shaft, and by which a 2½-inch steel shaft is reduced in diameter fully 1-16 of an inch. This compression materially increases the strength of the shaft, so far as its corrosion is concerned, (and that is the most vital point in shafting), something like 2½ times over that of the best wrought iron shafting; moreover the face of the shafting is left much better finished than is possible with any turning, filing or polishing tools.

THE *Homer Mining Index* says: A pack mule with 600 pounds on his back is not a strange sight in Lundy, but a millionaire with a dollar in his pocket would be a novelty.

## No Double Taxation in California.

An opinion by Justice Ross, concurred in by all the Justices of the Supreme Court, has been filed in the case of John H. Burke, against Assessor Badlem, denying plaintiff's application for a writ of mandate. The opinion says: In this case we are asked by the petitioner to grant a writ of mandate, compelling the assessor of the City and County of San Francisco to assess upon the assessment roll thereof, to various corporations, the respective shares held by them, and to assess to various depositors in various savings banks the respective sums of money deposited by them. Whether the Assessor has or has not assessed to the respective corporations all of their property of every character, and to the respective savings banks all of theirs, including all moneys deposited with them, does not appear from the petition; but as the Legislature has required the assessor to do these things, we must presume that he has or will perform his duty in this respect in due time. The claim of the petitioner, however, we understand to be this: That the assessor must assess to all the respective corporations all of their property of every kind, including their franchise, and to the individual stockholders thereof the respective shares of stock held by them, and must assess to the respective savings banks all of their property, including all moneys deposited with them by depositors, and also to the individual depositors the respective sums of money so deposited by them. If this would in effect be assessing the same property twice for the same tax, it cannot be done. The Constitution of the State does not require or authorize double taxation. On the contrary, its language clearly forbids it. After citing authorities, the opinion says: What is the stock of a corporation but its property, consisting of its franchise and such other property as the corporation may own? Of what else does its stock consist? If all this be taken away, what remains? Absolutely nothing. When, therefore, all the property of the corporation is assessed, then all the stock of the corporation is assessed, and the mandate of the Constitution is complied with. This property is held by the corporation in trust for the stockholders. The share of each stockholder is undoubtedly property, but it is an interest in the very property held by the corporation. Property rights are confined to the property held by a firm, just as the property rights of the stockholder in a corporation are confined to the property held by the corporation. Take away all the property of a corporation, which includes its franchise, and the shareholder no longer has any property. If it is competent to assess to the corporation all the property held by it, and to the individual stockholders the respective interests owned by each therein, so must it be competent to assess to every partnership the property held by the firm and to each individual partner his interest therein. It is clear to our minds that in one case the partner, and in the other the stockholder, would be compelled to pay twice on the same property, which is neither required nor permitted by the Constitution. Justices McKinstry, Chief Justice Morrison and Justice Myrick specially concur in the opinion.

Chief Justice Morrison says: I concur in the views of Mr. Justice Ross so far as they relate to savings banks and deposits therein. I am of the opinion that money deposited in savings banks should be assessed but once, either to the bank or to the depositor, and not to both. On the other question involved in the case (the taxation of shares of capital stock of corporations), I express no opinion.

Justice Myrick says: I concur in the views expressed by Mr. Justice Ross, except as to the assessment to depositors of moneys deposited in the savings banks named in the petition. Upon that subject I express no opinion.

"SLUMGULLION."—"Slickens" is a granger word used in California to designate the slimy deposit or sediment which settles upon the farming lands irrigated with the dirty water from hydraulic and other mining operations in the mountains. The original and only proper and appropriate term for that stuff is "slumgullion." That was always its legitimate name from the earliest times down, among the old miners. Here in Nevada what is known as "slums" or "slimes" is the sediment from quartz milling operation, and carries a considerable amount of silver in form of chloride. Caught and settled in dams or ponds, some of these slums or slimes pay well for re-working. It is of a similar nature and consistency as the California slumgullion. "Slickens" What grass-haired cow boy gave it that name there in California? Anybody who ever waded through, shoveled or had anything to do with a deposit of that familiar old material knows that the only natural word which fully expresses its character is "slumgullion." The substitution of the word "slickens" simply shows degeneracy, and the degree to which California has become grangerized.—*Gold Hill News*.

NORTH of Laramie peak many discoveries of the precious metal have been made during the past year, and the recent find of a very rich deposit of silver and copper at Copperopolis, north of the North Platte, has given a new impetus to prospecting on that side of the peak.

REPORTS from Halifax (N. S.), say that gold has been discovered at East Chezzetcook, Halifax county. The specimens of quartz brought in are rich.



## THE ENGINEER.

**THE SECOND BRIDGE BETWEEN NEW YORK AND BROOKLYN.**—The bridge from New York to Brooklyn, crossing Blackwell's island, is under contract, and the contractors are now busy on the iron work of this pier foundations. The estimated cost of the bridge is \$5,000,000; the time fixed for its completion is three years. There will be four piers, one at Ravenwood, another at the coal dock on Blackwell's island, a third on the west side of the island, and the fourth on the New York side, between 76th and 77th Sts. The bridge will be 74 ft. wide, and will be arranged for two sidewalks, two carriage ways and two steam railroad tracks. The span over the water from Ravenwood to Blackwell's island will be 618 ft., that across the island 700 ft., and that over the river to New York 734 ft. Each pier will rest on bedrock, the dip of whose strata at all points is nearly vertical. The Ravenwood pier, only, will stand in the water. One corner, only, of the New York pier will touch the water. The roadway will be 154 ft. above the river at high tide.

**ELECTRIC RAILWAYS** appear to be a practical success. The electric railway on which Siemens and Halske, the Berlin electricians, have been for some time experimenting in that city, was publicly opened May 13th, in the presence of the railroad officials and a large number of scientific men. The road runs between the suburbs of Lichtenfeld and Cadettenhausen, a distance of six miles. A tram car was fitted up with an electric battery concealed between the wheels, the rails of the track being used as the conducting medium in connection with the principal battery at the station. The trial is reported to have been an entire success, a speed of 13 miles, the highest speed allowed by the authorities, having been obtained. The road is now in regular operation. Meantime, what has become of Edison's electric railway devices which he was long ago to set in operation? While the American inventor has been promising very largely, his European competitors seem to have been fulfilling.

**FLOODING THE SAHARA.**—Dr. Lenz, recently returned from an expedition across the desert to Timbuctoo, condemns as impracticable the project of flooding the Sahara. In his lecture, which was delivered before the Paris Geological Society, he says that fresh-water fossils are met with in many parts; therefore the desert is not the bottom of a salt sea. The temperature is not as high as might be expected; wild beasts are uncommon. The most formidable enemies are the Touareg tribes, who have, it is reported, lately massacred the French Trans-Saharan expedition. Per contra to the above, Commandant Roudaire has finished the investigations, which were indicated by the commission of the French Academy, in relation to the filling of the Tunisian and Algerian chotts by the sea. His conclusions are entirely favorable to the project, and would lead to the establishment of an interior sea 400 kilometers (248.55 miles) long and 1,600 kilometers (994.2 miles) in circumference.

**A PRIZE OFFER.**—The French Society for the Encouragement of National Industry, offers a prize of 2,000 francs, to be given in 1882, for an engine of 25 to 100 horse-power, to burn not more than 700 grammes, 1.54 pounds of good coal per hour per horse-power, and a prize of 1,000 francs for a motor, suitable for small workshops, of the power of from six to 20 kilogramme-metres per second. Similar prizes for a small motor were offered last year, the first being taken by a hydraulic engine, and the second by a gas motor, and it has been decided to offer the same again, in order to secure varied designs. Other premiums are offered for machines for various manufacturing processes; and in 1885, 3,000 francs will be given for the best method of conveying power to a distance.

**AN EXPERIMENT** made in the port of Kiel proves that heavy weights may be readily lifted from the bottom of the sea by means of a balloon. The balloon is made of canvas and metal plates, with an attached cistern containing carbonic acid gas compressed to a liquid state. When made fast to a sunken object, the communication between the cistern and balloon is opened; inflation takes place; the sunken vessel, or whatever else it may be, is lifted, and can be towed away at pleasure. In the experiment at Kiel, an anchor-stone weighing 15 tons, was thus lifted from a depth of 32 ft. The lifting power of a balloon 10 ft. in diameter is said to be more than 100 tons.

**THE PANAMA CANAL.**—Mr. John M. Wilson, United States Consul at Panama, who is now in Washington, says it does not look as though M. de Lesseps ever intends to build a canal there. Nothing has been done thus far. The little party of Frenchmen who are surveying and about 100 negroes constitute the whole native force.

**THE LONGEST SPAN OF WIRE.**—The longest span of telegraph wire in the world is stretched across the Kienah river from bill to bill, each bill being 1,200 ft. high, between Bezorah and Sectanagrum, in India. The span is a little over 6,000 ft. in length. The only mechanical contrivance used in stretching this cable across the river was a common windlass.

## USEFUL INFORMATION.

**GLASS-COATED TIN PLATES FOR CANNING.**—The liability of evil effects from the chemical action of acids and salts, in the substances packed in tin cans, has for a long time been a serious drawback to the canning and packing industry in this country as well as in England, and much study has been devoted to the subject of an improved material. A firm at Dunstable, England, it is said, has invented a method of coating tin-plates with a material which interposes a film resembling glass between the surface of the metal and the fruit or other contents. The insoluble portion of the composition is silicate of lime or fluo-silicate of lime (glass powder), previously acted on by fluoric acid; the soluble portion being silicate of soda and potash. Preferably, that kind of silicate of lime is used which has been produced by double decomposition from polysulphide of calcium, chloride of calcium and hydrate of lime; or, there may be used a silicate of the earthy bases or metals, or precipitated gelatinous silica. The alkali may be fixed or removed by a bath containing a dilute solution of fluo-silicic acid, when fluoric acid has not been used, or a dilute solution of any other suitable acid. To make the composition, mix the soluble with the insoluble silicate in equal proportions, although those may be varied according to the consistency required. The plates are coated with the composition with a brush, or by dipping into a bath. After coating, the plates are dried by heat and are ready for manufacture. This invention furnishes a plate with a surface somewhat resembling glass without the aid of infusion; and this coating, which is perfectly insoluble and unaffected by acids or salts, cannot be separated from the metal, which may be bent or worked in any manner desired, and cans thus made possess all the virtues of both glass and tin.

**A FILLER FOR POROUS HARD WOODS.**—Use boiled oil and corn starch stirred into a very thick paste. Add a little japan and reduce with turpentine. Add no color for light ash. For dark ash and chestnut, use a little raw sienna; for walnut, burnt umber and a slight amount of Venetian red; for bay wood, burnt sienna. In no case use more color than is required to overcome the white appearance of the starch unless you wish to stain the wood. This filler is worked with brush and rags in the usual manner. Let it dry 48 hours, or until it is in condition to rub down with No. 0 sandpaper, without much gumming up, and if an extra fine finish is desired fill again with the same materials, using less oil, but more of japan and turpentine. The second coat will not shrink, it being supported by the first coat. When the second coat is hard, the wood is ready for finishing up in any desired style or to any degree of nicety by following up the usual methods. This formula is not intended for rosewood, and will not be satisfactory if used therefor.—*T. F. Page, in the Coach Painter.*

**CONCRETE SLAG.**—The London (Eng.) Engineer says that the Aireside, Hematite Iron Co., which has introduced concrete slag as a substitute for building stone, has erected new offices at its works in Hunslet, Leeds, in which all the door and window facings and the ornamental work, are composed of the slag from its own furnaces. A new feature of such an elevation is a display of imitation carved bricks, in various colors, made of the slag, the cost of which is said to be 50% less than the real article of clay, which hitherto has been so much in fashion. The company also supplies the Midland and Northeastern railroad companies with slag concrete flags, ready for use in the laying down of platforms at railroad stations. The Staveley company has long used slag lumps for building.

**THE fusibility of soft solders** is increased by adding bismuth to the composition. An alloy of lead, four parts, tin, four parts, and bismuth, one part, is easily melted; but this alloy may itself be soldered with an alloy of lead, two parts, bismuth, two parts, and tin, one part. By adding mercury a still more fusible solder can be made. Equal parts of lead, bismuth, and mercury, with two parts of tin, will make a composition which melts at 122 F.; or an alloy of tin, five parts, lead, three parts, and bismuth, three parts, will melt in boiling water. In mixing these solders, melt the least fusible metal first in an iron ladle, then add the others in accordance with their fusibility. To cast strips of solder, pour the molten metal on a flat surface of stone or metal.

**HOW SLEIGH BELLS ARE MADE.**—It has no doubt been a mystery to many how the iron hall inside of sleigh bells got there, and it is said to have taken considerable thought on the part of the discoverer before the idea struck him. In making sleigh bells the iron hall is put inside a sand core, just the shape of the inside of the bell. Then a mold is made just the shape of the outside of the bell. The sand core with the jinglet inside, is placed in the mold of the outside, and the melted metal is poured in, which fills up the space between the core and mold. The hot metal burns the core so that it can be all shaken out, leaving the hall within the shell. Ball valve, ewell joints and many other articles are cast in the same manner.

**THE "CRY OF TIN."**—If a piece of tin be bent, it emits a sound; this, being regarded as a property peculiar to tin, has been termed the "cry of tin." This phenomenon is explained by the peculiar crystalline structure of the metal. Reasoning that, if this explanation be the true one, then other metals obviously crystalline in structure should also exhibit the same phenomenon, Mr. J. C. Douglas, who records his observations in the *Chemical News*, heated a piece of rolled zinc for a few minutes to a temperature somewhat below its melting point, when the metal became much less tough and its fracture decidedly crystalline. On bending a piece so treated, it emitted a sound weaker than that emitted by tin, but of the same nature. Cast zinc cannot be bent readily; but if pinched between the teeth or with pliers, it emits the sound distinctly. The conclusion, therefore, is that the cry of tin is due to crystalline structure, and may be emitted by zinc and probably by other metals when crystalline in structure. The practical application is, that by the sound a metal emits "we may draw conclusions as to its texture, and hence its fitness for certain purposes, or, by the sound emitted by a beam when bent, we may draw conclusions as to its safety, the microphone or other appliance being called in to aid us where the sounds are exceedingly weak."

**COOKING BY ELECTRICITY.**—Of the many curious things certain to be seen at the forthcoming exhibition of electricity at Paris, not the least remarkable will be the electrical cooking range of M. Salignac. That ingenious gentleman is going to fit up his apparatus in the grill-room of the restaurant, and intends to furnish a great variety of meats which have been cooked by heat generated from the electric current. At the last Paris Exhibition, M. Mouchot roasted mutton in condensed sunshine, and literally turned his spit on the hearth of the sun; but an enthusiastic admirer might say that M. Salignac had far surpassed this in broiling steaks by lightning and warming coffee with the aurora borealis. As a matter of fact, the electric current is as well fitted to produce heat as it is to produce light, and just as electricity will, in all probability be made to yield the principal artificial light of the future, so will doubtless it be applied to household heating. The same machines which light the house by night will heat and cook by day, besides performing other duties, such as driving a coffee mill or sewing machine.

**BIRCH FOR CABINET WORK.**—The small value of birch wood for fuel, and its lack of toughness and strength, except in the smaller twigs, have led to its general neglect in the arts. Our more enterprising builders of railway cars, however, have discovered that its light weight, close grain, and rich finish make it admirably suited for certain applications where fine finish and bright effects are desired. The contrasts presented when white birch and light colored ash are relieved by the red of the cherry birch, are said to be peculiar but very pleasing.

**NEW LUBRICANTS.**—K. Drechsler mixes graphite thoroughly with the whites or yolks of eggs, dries the mixture, pulverizes it and scatters it upon the parts of machinery which move slowly. G. Lieckfeld mixes graphite with soluble glass, so as to make a stiff broth. The mass is spread upon worn surfaces, where it soon hardens and can be filed or turned, so as to restore the machinery to its original perfection.

**VARNISH FOR METAL.**—A brilliant black is produced on iron and steel by applying, with a fine hair brush, a mixture of turpentine and sulphur boiled together. When the turpentine evaporates there remains on the metal a thin layer of clear sulphur, which unites closely with the iron when heated for a time over a spirit or gas flame. This varnish protects the metal perfectly, and is quite durable.

## GOOD HEALTH.

## How to Dress the Children.

There is no animal I know of born into the world in a greater state of helplessness than the human infant, and none more dependent upon artificial means to keep up the animal heat. It would very soon succumb to the cold if not protected. This is proved by the fact that a very much larger proportion of children die during the winter than during the summer months, although as regards the mortality of the young and middle aged, there is very little difference between those seasons. The older a child gets the better it becomes able to resist cold, but—and I would that mothers would bear this well in mind—until a boy or girl is well into his or her teens should foster warmth he looked upon otherwise than as a friend, or cold otherwise than as a deadly foe. Children in the cradle are seldom or never neglected by well-to-do parents, but it is when a child begins to run about, and is able to go out of doors, that mistakes are made about the clothing, which often leads to speedily fatal illness, or sow the seeds of future ailments, which render life a misery and a burden, that can be only laid down at the portals of the tomb. Instead of studying warmth and comfort in the clothing of their children, many mothers study only fashion. I speak advisedly, for I have proof of what I aver every day of my life.

It is not my province to tell my lady readers how to cut the patterns for their children's dresses, or even to choose the material from which to make them; but as a medical man it is my duty to remind them that the child who is clothed warmly, cleanly and neatly is far better dressed than one whose attire shows it to be a victim to a votaries of fashion. The one has a chance of turning out a healthy man and a useful member of society, the other has not. To those who are between the ages of 10 and 20 I have to say that, with no desire to advise them to be overclothed, and thus made hothouse plants of, too much attention cannot be paid to keeping them warmly clad. Cold is fatal to the young; warmth is life itself; cold retards the building up of the tissues of bone and muscle, warmth encourages it; cold interferes with the due performance of the functions of the skin, throws extra work on the liver and kidneys, and blunts the nervous energy of the brain itself; warmth has altogether a contrary effect.

Some parents labor under the erroneous impression that they are making their children hardy by allowing them to expose themselves to the deleterious effects of the absence of warmth. To maintain the normal heat in the young it is not necessary that the clothing should be heaped upon them, nor that they be carefully made prisoners of indoors, whenever the day is chill or the winds blow high. The clothing should be light rather than heavy—light and protective; and the material itself should be studied, not the quantity.—*Harper's.*

**ORIGIN OF DIPHTHERIA.**—The observations of Mr. G. H. Fosbrooke, medical health officer of Birmingham, England, have led him to form conclusions respecting the origin of diphtheria, which differ in some points from those which have been urged by other authorities. He regards it as a well-established fact, confirmed by his experience, that the disease is more common in rural than in urban districts, and has observed that even when it has prevailed extensively in a rural district, and has thence been conveyed into a neighboring town, it has not spread in the town. In one town of 5,000 inhabitants, diphtheria, when it occurred, prevailed concurrently with typhoid fever or scarlatina, giving rise to the suggestion that all those diseases might originate in a common poison. Mr. Fosbrooke does not agree with other authorities as to the conditions of soil most favorable to the propagation of diphtheria. Generally the disease has been thought to flourish most in damp situations and in connection with damp soils. All of his attempts to associate its origin and distribution with any peculiar soil or situation have failed, for he has met it both in villages occupying elevated and airy situations and in low places. The most serious epidemics, and the larger number of cases of which he has had personal knowledge, have appeared on soils that were "rather gravelly and well drained." With one exception, his experience opposes the idea that houses shut in by trees are more liable to harbor the disease than those which are not surrounded by an abundant vegetation. The fluctuations of diphtheria, when it prevails for any considerable length of time, do not appear to be influenced by changes of season or by variations of weather. Meteorological observations, made with reference to this point, differ widely, and furnish no guide to an opinion. The disease is generally found first to break out in October, and to prevail as an epidemic, when it does so prevail, in the winter months, increasing, as is natural with epidemics, during the earlier months of its course, but without regard to the regularity or irregularity of the season.—*Popular Science Monthly.*

**COD LIVER OIL.**—Under the heading of "Practical Notes," Mr. R. B. Fairthorne suggests, in the *American Journal of Pharmacy*, a new method of taking cod liver oil. As the use of this remedy is at the present time more extensive than ever before, any means employed whereby it can be more readily taken without causing disgust will prove of service to sufferers who have to use it daily. Mr. Fairthorne's method consists in adding two drams of tomato or walnut catsup to each ounce of the oil, the mixture being well shaken whenever required for use. He has found this mixture to agree with many persons much better than any other form in which cod liver oil has been taken, and this he attributes to the association of substances generally employed as additions to food, bringing into operation those digestive faculties of the stomach which might otherwise remain dormant when such incongruous substances as sugar and one of the principal ingredients of fish are introduced together into the stomach. Mr. Fairthorne also states that the following forms a most palatable mixture, which is readily taken by the patient: Liebig's extract, ½ ounce; extract of celery seeds, ½ fluid dram; vinegar, 1 fluid ounce; water, 2 fluid ounces; cod liver oil, 5 fluid ounces. The extract of beef is to be dissolved in water, and the oil and vinegar to be added and shaken well together with the extract of celery.

**SINGULAR MISHAP.**—A Rochester shoe-cutter who had his hand caught in some machinery, placed a cobweb over the wound to staunch the flow of blood. The web contained a small spider, which stung the man so severely, that his whole arm has swollen to twice its natural size.





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W. B. EWER.

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W. B. EWER.

O. H. STRONG.

SAN FRANCISCO:

Saturday Morning, June 11, 1881.

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## Passing Events.

The most important event of the week has  
been the shutting down of a number of the hy-  
draulic mines of this State, owing to an injunc-  
tion having been granted against them in favor  
of the city of Marysville. We give full details  
of the decision in another column. At Smart-  
sville the foremen and miners of the Excelsior  
Water Mining Co. were discharged. Several  
hundred men, a majority of whom have large  
families to support, will be obliged to seek other  
homes, unless the mining is resumed. The loss  
to the laboring class will be \$25,000 per month.  
The feeling is very intense in the regions af-  
fected, and is the general topic of conversation.

The State has been visited by a refreshing  
rain, which, while it may have slightly damaged  
some of the hay, has laid the dust and puri-  
fied the atmosphere.

In another column we announce a most im-  
portant discovery—no less than the finding of  
beds of nitrate in Nevada. It is highly proba-  
ble that similar discoveries will follow this, as  
there are many other parts of Nevada and of  
this State favorable to its formation. Probably  
Arizona may also be found to produce nitrates.

The decision of the Supreme Court with  
reference to double taxation, which we give  
elsewhere in this issue, is one which will give  
satisfaction, as settling a very important point.

In Europe the advices tell us that Irish land  
troubles still continue, with no present prospect  
of any abatement.

The action of the Board of Regents of the  
University of California, with reference to the  
changes in the faculty, is an absorbing topic  
just at present. President Le Conte has re-  
signed the presidency, but will remain in the  
Chair of Physics. Secretary Stearns, of the  
Board of Regents, has also resigned. The sala-  
ries of the professors have been reduced, and  
those of the assistants have been raised, and  
several professorships have been declared vacant.

## Our Arizona Edition.

We shall issue next week a 36-page edition of  
the MINING AND SCIENTIFIC PRESS, devoting its  
space largely to the interests of the great min-  
ing regions of Arizona. With it we shall pub-  
lish a large double-page map of Arizona, show-  
ing its mining districts, mines, reservations,  
railroads, towns, and all geographical features.

We shall also devote considerable space to  
the electric light system as applied to mines,  
with numerous illustrations. We have had  
prepared a fine engraving of the latest improved  
copper-smelting furnace, now in use in many  
places on this coast, and have quite a number  
of illustrations of general interest. In fact,  
the MINING AND SCIENTIFIC PRESS of next week  
will be a more than usually valuable one for  
miners.

We aim to continually improve this journal  
and keep pace with the times in all matters re-  
lating to mining and metallurgy in particular.

The PRESS is now the oldest of the mining  
journals of this country, which is something to  
be said in view of the great number of mining  
papers now being published.

We began over 20 years ago to devote our  
columns to the mining interests, and we have  
continued to do so ever since.

We shall print a very much larger edition  
than usual next week, and shall send a copy of  
the PRESS to all the quartz mills on the coast,  
in addition to the numbers that will be dis-  
tributed elsewhere. It is scarcely necessary to  
say that this will be a first-rate opportunity for  
advertisers. And it will, moreover, be a good  
time for those who are not subscribers to be-  
come so, as a new volume will commence in two  
weeks more.

## Mineral on Land Grants.

Nearly every California miner will recollect  
what trouble has been made with Spanish  
grants in various parts of the State. The fa-  
mous Mariposa Land Grant case is familiar to  
most old timers. The trouble in Julian district,  
San Diego county, over the Cuyamaca grant,  
was similar, though as it turned out the grant  
did not take in the prominent mines.

The trouble to which we allude is that the  
owners of Mexican grants, which usually cover  
very large areas of land, have not only title to  
the land, but to the minerals it contains.

Therefore, any one finding minerals within the  
boundaries of these grants, had to pay the  
grant owner for it or have it taken from him  
although a bona fide discoverer. In a num-  
ber of instances even have developed mining  
property without knowing they were on a grant,  
and then had to give up their claims in the end.

People going to New Mexico to prospect will have  
the same trouble we had here for the same con-  
ditions exist there as will be seen by the following  
paragraph from the *Cimarron News and Press*.  
"However much one may deplore the fact that  
the mineral was not reserved by the United  
States in its confirmation and patent of land  
grants in this Territory, there seems no doubt  
that this was not done and that the title of con-  
firmed grants to mineral is good and unassail-  
able. It is probably true that in many cases  
the United States could, under the terms of the  
Gadalupe Hidalgo treaty, have followed the  
custom of the Mexican government in reference  
to mineral lands and reserved the mineral to  
themselves. Had they done this the owners of  
grants, not by terra mineral, would probably  
have had no redress, but the Government fol-  
lowed, instead, the custom long established in  
the United States and conveyed with the land  
all the title of the United States to everything  
within and above the ground. It is probable  
that this custom may be changed by legislation  
next winter, and that in grants hereafter con-  
firmed the mineral will be reserved by the Gov-  
ernment in all cases where such reservation is  
possible. It is an error to suppose that New  
Mexico and California are the only parts of the  
United States where this same question of owner-  
ship of mineral on lands supposed to be agri-  
cultural has arisen. The farmers of Southwest-  
ern Missouri found themselves wealthy only a  
few years since when lead was discovered there.  
The farmers and fishermen of Maine and the  
farmers of North Carolina and Georgia are also  
now reaping a golden harvest they have not  
sown and of whose existence they did not, until  
recently, dream. There is no question among  
miners in these localities as to the absolute  
ownership of the mineral by the owners of the  
soil, and there will be none in this Territory  
within a few years."

THE Wood river prospects, according to the  
Idaho *World*, are going into the hands of capi-  
talists at a rapid rate, and the discoverers are  
receiving handsome sums for their finds. The  
mine there, instead of "petting out," as was  
feared they would do, continue to show up bet-  
ter as they are gone down on, and the develop-  
ments that have been made are sufficient to  
prove their permanency almost beyond a doubt.

## Nitrates in Nevada.

## A Highly Important Discovery.

One of the most important mineral discoveries  
ever made on this coast has just been brought to  
light in Nevada. It is, in fact, one of national  
importance if the extent of the deposits be at  
all as represented and supposed. It is no less  
than the discovery in Nevada of large beds of  
nitrates, similar to the famous ones Chile, from  
which that government has derived large reven-  
ues, and which have been of so much use to the  
world.

Some small pieces of nitrates were found at  
Brown's station on the Humboldt desert about  
a month since. These were sent to our State  
Mineralogist for examination. His remarks on  
the subject, when published, called attention to  
the peculiarities of the mineral, and led to the  
present discovery.

On the 31st ult., John Eitel, assayer, of Sac-  
ramento, wrote as follows to Mr. Hanks, the  
State Mineralogist of California.

"The house of Booth & Co. have left a salt with  
me, which, I believe, was sent to them from  
some part of Nevada, the parties desiring to  
know its commercial value. I made a qualita-  
tive analysis of it and found it to be similar to  
Chile salt-peter. As I understand it, the com-  
mercial value depends on the nitrate of soda  
contained in it, which, however, can only be  
ascertained by taking a quantitative analysis, and  
for this they do not like to pay, it seems. I  
either read, or some person informed me that a  
similar salt was submitted to you for analysis.  
Therefore I concluded to inquire what you  
think the material is worth per pound in large  
quantities."

After the receipt of the letter, Mr. Hanks  
examined the specimens, and wrote as follows:

SAN FRANCISCO, June 2.

JOHN EITEL.—Dear Sir: The substance of  
your letter, dated May 31, is very interesting.  
Nitrate of soda does not exist in nature in a  
pure state. In Chili and Peru it is extracted by  
solution in water from very low grade material  
and recovered by evaporation and crystalliza-  
tion. Commercial nitrate of soda is quoted to-  
day at 34 cents per pound—equal to \$70 per  
ton.

I would like to be put in communication  
with the parties who have discovered the de-  
posit from which your samples were obtained.  
The discovery of a large quantity of any nitrate  
in the locality you indicate would not only be  
of great importance to the Pacific coast, but to  
the whole United States, and would like to  
have the opportunity of investigating it. Very  
truly,

HENRY G. HANKS, State Mineralogist.

In reply to the above the following was re-  
ceived from the owner of the deposit:

LOVELOCK, C. P. R. R., June 6, 1881.

HENRY G. HANKS, Esq.—Dear Sir: In re-  
ply to your letter of the 2d ult., addressed to  
Mr. Eitel, of Sacramento, I would state that  
there appears to exist in a certain place about  
eight miles from here a large quantity of min-  
eral similar to the sample furnished you by Mr.  
Eitel. We have located the ground according  
to the mineral laws of the United States, and  
will do something toward developing it. And  
will be very glad to communicate with you in  
the matter. Will forward to you samples of  
the mineral, together with description of for-  
mation, character of rock, etc., or, in fact, any-  
thing you desire, in order to get your assist-  
ance toward awakening an interest in this heretofore  
neglected subject. Would be pleased to  
hear further from you, and will take pleasure  
in sending you any sample or statement in my  
possession. Hoping to hear from you soon, I  
remain, yours respectfully, D. B. MERRY.  
Mr. Hanks has verified the result of the analy-  
ses, and finds the mineral to be a very rich ni-  
trate of soda. He informs us that in his opin-  
ion this is one of the most important discov-  
eries ever made on this coast. He has no doubt,  
moreover, that other similar deposits will be  
found, as large regions of Nevada and Califor-  
nia are of a formation suitable for its existence.  
Many years ago he predicted the discovery of  
nitrates in the southern part of this State, but  
as yet no deposits have been found. It may be  
that the mineral has been overlooked by pros-  
pectors through lack of knowledge concern-  
ing it. We shall know in a short time more  
particulars regarding the extent of the find.

The nitrates are used as a source of nitric  
acid, as fertilizing agents, and for a number of  
purposes. Without them we should not be able  
to manufacture gun powder, as the "salt-peter"  
is a nitrate. With large beds in our own coun-  
try, the Government, in case of war, would  
have all the articles for the manufacture of pow-  
der within its own territory, which has not  
been the case hitherto.

THE MOUNT POTOSI DIRECTORSHIP.—In the  
matter of the application of G. F. Glover, to  
set aside the election of Directors of the Mount  
Potosi Con. M. Co., Judge Sullivan, of the Su-  
preme Court, decided that the election of A. J.  
Holmes, S. B. Boswell, Culvert Mead, R. S.  
Wilson and C. G. Strong as such Directors, on  
the 22d of September, 1880, was illegal, and  
continued the hearing of the question of the  
validity of the election of Montague K. Ste-  
venson, James M. Day, Henry Lowden, N. D.  
Thayer and J. H. Frish as Directors, on the 2d  
of May last, until the 16th of July.

## Contributions to the Geology of California.

## New Series.

H. G. HANKS, STATE MINERALOGIST, CALI-  
FORNIA:—Recognizing the importance to the  
State of the work in which you are engaged,  
and the gratifying measure of success which has  
already attended your efforts to establish a per-  
manent geological and mineral collection, I take  
pleasure in offering you a series of written con-  
tributions upon the minerals and the geology of  
California. As these contributions will be based  
upon the observations I make in traveling  
through various portions of the State, and will  
often be written during the journeys, they will,  
of necessity, be somewhat desultory and in-  
formal, but I hope they will assist in making  
the varied and interesting geological features of  
California better known.

## New Mineral Localities.

ERTHYRITE: Cobalt Bloom.—In minute  
mamillary incrustations, showing, when  
broken, radial aggregations of silky, fibrous  
crystals. Color: deep carmine or rosy-red, also,  
peach blossom red. Streak, the same color, but  
is blue after the mineral has been heated. It  
gives the usual reactions for cobalt, arsenic and  
water. Occurs, also, in massive earthy aggre-  
gations, of small fibrous crystals of a rose-pink  
color. It is associated with an ore of silver and  
cobalt in dark-colored earthy masses, a mechani-  
cal mixture, assaying at the rate of 5,000 to  
6,000 ounces of silver to the ton, but the precise  
nature of which is not yet ascertained, in a  
gangue of heavy spar, containing, also, nodular  
masses of chalcocite (yellow copper ore.)

From the Bernardino range, Southern Cali-  
fornia. This is believed to be the first observa-  
tion of the occurrence of this species in the  
United States.

RUBELLITE: Rose-colored tourmaline.—This  
very interesting mineral is now observed for  
the first time in California, in the form of long  
alender crystals from one-sixteenth to one-  
eighth of an inch in transverse diameter, with  
the usual triangular section. Color, a beautiful  
rosa-pink, contrasting well with the matrix of  
white lapidolite.

When ignited the color disappears and the  
mineral becomes perfectly white. Infusible.

Locality, Bernardino range, southern Cali-  
fornia.

LEPIDOLITE—occurs with the above in mas-  
sive aggregations of minute pearly scales, both  
colorless and purple-red in color. It is trav-  
ersed by the crystals of tourmaline. It fuses  
readily to a white enamel and colors the flame  
next to the assay a dark crimson-red for a mo-  
ment.

CASSITERITE: "Wood Tin."—A single speci-  
men of wood-tin, a segment of a botryoidal mass,  
with concentric structure and dark brown in  
color, was found by Mr. Thomas Lana, of La-  
porte, in the bed of the Middle fork of the  
Feather river, about three miles above Big Bar,  
Plumas county. The mass is about 8 of an  
inch in diameter, and closely resembles the  
wood-tin brought from Durango, Mexico, and  
that found in Idaho. The attention of placer  
miners should be directed to this, as other frag-  
ments may be found in cleaning up sluices, and  
thus lead to the discovery of the source of this  
valuable ore of tin.

BORNIK: Variegated Copper Ore.—This  
beautiful ore of copper is found upon the claim  
of Mr. A. J. Ford, at Light's Canyon, Plumas  
county, in a vein affording massive specimens  
three inches or more thick. In the same re-  
gion there are veins of yellow copper ore and of  
massive Hematite.

Wm. P. Blake,

San Francisco, June 3, 1881.

(TO BE CONTINUED.)

## Locating Gypsum.

Gypsum is not a mineral within the meaning  
of the Mining Act. In the opinion of the Com-  
missioner of the Land Office, lands of the pub-  
lic domain containing deposits of gypsum, which  
is of similar formation to limestone, are not  
subject to disposal under the mining act. Limestone underlies a great portion of the ter-  
ritory west of the Mississippi river, and to re-  
serve such lands as mineral would entirely pre-  
vent its development for agricultural purposes.

The term "mineral," in its most compre-  
hensive sense, includes all inorganic substances  
having a definite chemical composition, and so  
applied in the construction of Section 2,318 of  
the Revised Statute, would subject all the pub-  
lic domain to sale under the Mining Act. A  
more reasonable construction of said section  
will hold it to embrace only such lands as con-  
tain valuable deposit of metals, and other en-  
richments which give the same special value greater  
than that of land containing limestone deposits  
in any of its forms.

LIBRARY CONSOLIDATION.—At a recent meet-  
ing of the Board of Trustees of the Mechanics'  
Institute, a committee previously appointed re-  
ported that they had conferred with a committee  
from the Mercantile Library Association upon  
the advisability of uniting the institutions. They  
reported that both committees considered that  
the plan was a good one. Next Tuesday  
another meeting will be held to finally decide  
upon the proposition.



## Notes of a Trip to Yosemite.—No. 2.

[Written for the Press by O. H. S.]

This morning we made an early start and took our last views of the wonderful valley from the top of the stage as we rolled rapidly down the valley behind a six-horse team, and we were soon climbing the grade of the

## Big Oak Flat Stage Route.

After reaching the top of the grade the road winds rapidly down through the forest; and the rain of the previous day had extended a few miles beyond the valley, so that the air was fresh, and with the smell of the pines and the many beautiful wild flowers, it was extremely pleasant. During the ride we cross the pipes of the Golden Rock Ditch & Flume Co. This property has lately changed hands, and the present owners intend to use most of the water in future in working claims of their own. They have been prospecting some ground near where the stage road crosses the pipe, but have now closed down and will clean up, and as soon as work can be completed for the purpose, they will go to work extensively upon other ground of their own some 10 or 15 miles lower down.

Passing through Garrote and Big Oak Flat, formerly extensive mining camps, we reach Priest's hotel at 4 o'clock and stop an hour for dinner, after which we are driven down the two miles of Rattlesnake hill, at the foot of which we are transferred to another coach, driven today by Mr. J. H. Shine, one of the gentlemanly proprietors of the Nevada Stage Co. Crossing the Tiolumne at Haewell's ferry we enjoy the evening drive along the banks of the river through Jacksonville, and over a picturesque road to Chinese Camp, which is the usual stopping place for the night, but Mr. Shine offered to carry us on 11 miles further to Sonora in his own private carriage if we desired, and we were soon on the road again, reaching Sonora late in the evening, tired enough to enjoy the rest we took at the City hotel.

## Sonora and Columbia

Were two of the largest and most noted towns in the southern placer mine of California. They are but about four miles apart, and upon the flat between them upwards of 8,000 men are estimated to have worked in the rich placers which were found there. To-day the projecting rocks and pile of stones, bare and desolate, look as if the country had been subjected to some terrible convulsion of nature. For a long time after the first exhausting of the diggings, these places went down steadily like the other mining camps, but they now show signs of revival, especially Sonora. This is more especially due to the discovery of rich quartz ledges, among which the one called the Bonanza hill, situated almost in the middle of the town, is the most noted.

This mine is known as a pocket mine; and from its outcroppings it is supposed that most of the gold formerly found in the lower part of Sonora was derived. It was first discovered sometime early in the fifties, and was partially opened and worked at different times by various parties, who afterwards abandoned it. It is estimated that some hundreds of thousands of dollars had been taken from it in all before it fell into the hands of its present owners, who have developed its great wealth during the past five years. The mine is at present principally owned by Divoll & Bray, of Sonora. It runs down on an incline between 30° and 40°, about 260 ft., and is said to be paying enormously, although its owners are inclined to keep their business to themselves. One single shipment from this mine was made by express of 983 lbs. of gold, which certainly gives good grounds for the rumour.

A number of other promising mines are being opened, some \$6,000 or \$7,000 having been recently taken from the Colby mine which is but a short distance from the Bonanza Hill, and is thought by many to be upon the same ledge.

The road from Sonora to Murphy's leads through a hilly but pleasant country, passing close to a stream where there is a natural bridge about 240x100 ft., and from 50 to 60 ft. high. The arch through which the water flows varies in height and width, and time enough is given by the driver to examine it thoroughly. About four miles from Columbia a large cave has been discovered. It has not been wholly explored, but its interior is filled with stalactites and all the wonderful and fantastic formations common to these limestone caverns; it is said to be the finest ever discovered upon this coast.

## Murphy's

Is another pleasant little town where travelers often make a stay, but we only waited for our conveyance to the Big Tree, which proved to be a two-horse buggy, as the regular stage was full. Leaving Murphy's at half-past four in the afternoon, we enjoy a pleasant drive through a forest of trees increasing gradually in size, until when we pass between the "Two Sentinels," which lean above the road a short distance from the Mammoth Grove hotel, we are almost prepared for their great size. Not quite, though, for we are startled at the great shadows as we pass between them in the deepening darkness of the night, which is fast closing in as we drive up to the steps of the hotel and alight to prepare for dinner.

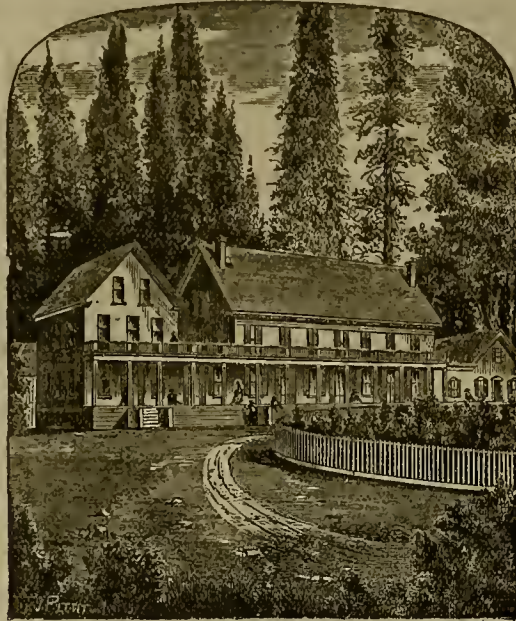
## Big Tree Grove.

The temperature was quite cool on the evening of our arrival and upon the following morning, but not enough to be uncomfortable.

Sperry's hotel has a very fresh, clean appearance, and is well arranged for the quiet and rest of guests. A great change is noticeable in the climate here from any of the places hitherto visited. It is said to be an excellent thing for those needing a change of climate to stop for a month or more. We certainly found it a very restful place after the excitement of the previous week and the roughness of long stage journeys.

The morning of our first day was spent in the grove near the hotel, which contains 93 of the sequoias, not including young ones. Paths are made among the trees so that all which are notable for size or any peculiarity may be easily visited. These trees are scattered through a forest of sugar and yellow pines, many of which are 275 ft. in height, and 10 or 11 ft. in diameter.

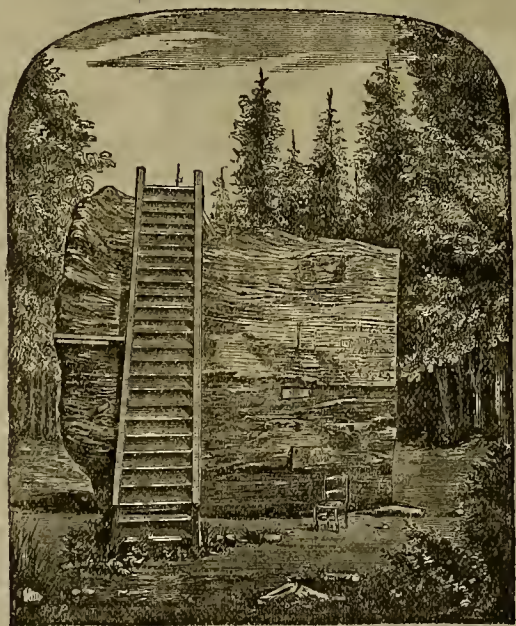
This bark was taken to England and set up for exhibition, but its size was so tremendous that it was treated as a Yankee humbug and was believed to have been ingeniously constructed for the purpose of deceiving those visiting it. The tree is, of course, dead, and will doubtless come down during some heavy storm within a few years. The Father of the Forest, already fallen when the grove was discovered, measured 112 ft. in circumference at the base and still shows a length of 300 ft. to the point where it was broken by falling against another tree. At this point it is 16 ft. in diameter, and it must originally have been 450 ft. in height. We walked 200 ft. through the immense cavity which is burned through its center, to a point where we could emerge through a knot hole two and one-half ft. in diameter.



SPERRY'S MAMMOTH GROVE HOTEL, CALAVERAS GROVE.

ter, and would be considered enormous, but for the comparison with the sequoias, which make the largest of them look small; but here, as at Yosemite, we seem to have found something too grand for our immediate comprehension. We listen to a statement of the size of the trees, walk up and examine them, and climb upon the

eter, formed by the breaking off of a limb. One is struck in examining the fallen trees at the comparatively small size of the roots, the apparently entire absence of tap roots, and the shallow cavity left by their uprooting. The wonder is that they stand as long as they do. The cones from these trees are ridiculously



SECTION OF ORIGINAL BIG TREE, CALAVERAS GROVE.

fallen ones, looking down from an elevation of upwards of 30 ft., and yet fall. We have nothing of ordinary size to which we are accustomed for comparison; but when we remember that one of these trees, if set upon an ordinary city house lot would entirely cover its width, and project eight ft. upon the next lot, we begin to appreciate their size. Our party of 11 stood around one of the trees with extended arms, just touching the tips of our fingers, but the two ends of our line could not get within sight of each other; in fact the line would not reach much more than half around some of the trees. The bark which has scaled off the trees for hundreds of years has formed mounds three or four ft. high, close about their trunks; and the best idea of their vast size may be obtained by walking around the tree upon this mound, close to the trunk. Most of these trees have been named after scientific men—generals, divines, and men more or less famous. The one called the Mother of the Forest, from which the bark was stripped to the height of 116 ft., is the termination of the walk northward.

small, being but about 2 inches long, while all around the ground is covered with cones from the pines 15 to 18 inches long, and 5 or 6 inches in diameter. Almost all the trees show evidence of destructive fires, some of them having enormous cavities burned into them and extending upward from 50 to 100 ft., leaving apparently but a mere shell to support the round upper portion and branches, yet these trees appear as healthy and vigorous as if sound throughout.

## South Grove.

Our morning excursion terminated in time for lunch, and the afternoon was spent in various ways. On the following morning horses were waiting us after breakfast had been disposed of, and under the guidance of Abel Richey, the well-known guide, who had accompanied us upon the previous day, we started for the South Grove. The way led over a ridge which separates the Big Tree creek from the north fork of the Stanislaus. From this elevation we obtain a fine view of the Dardanelles, distant peaks of the Sierras, which tower to the height of

12,500 ft. After a few moments we descend the winding trail through Squaw hollow to the haaks of the Stanislaus, crossing upon a rough bridge, which spans the stream just at the foot of a pretty cascade which comes tumbling down among the rocks in a mass of foam. From this point we ascend to another crest from which we have a fine view of the Basaltic cliffs opposite. Continuing our journey we finally descend to the banks of Beaver creek where we called a halt to allow some ambitious disciples of old Isaac Walton to try their luck in this stream which is deservedly famous for its trout.

The south grove, which we soon reached, is much larger than the one at the hotel, extending about three and one-half miles, and contains a great number of very large trees. In the base of one is a cavity which will contain 16 horses and their riders. The ravages of fire are also seen in this grove, but only upon the Sequoias. The immense pines, some of which are 12 ft. in diameter, show no marks, and as they are evidently of a later growth, the inference is that these fires occurred before the pine forests started. What might have been the appearance or extent of the sequoia forests previous to that time, must always remain a matter of conjecture.

We rode alongside of one which had fallen long since, and the cavity being upon at the top of the tree lay, made it look like an immense canal boat. In other places we ride through or between trees which have burned, until we reach a tree having a cavity in its base 21 by 16 ft. This tree is called Smith's cabin, from an old trapper who resided in it two years, the apartment being divided into a kitchen, dining room and bedroom. Near this cabin is "Goliath," a tree which fell some years since and is the largest of the fallen trees.

Two hundred and sixty-one ft. from the base, it measures 45 ft. in circumference. This grove has many beautiful and interesting features beside the great trees, and one day is hardly sufficient to dispose of the whole.

The next day completed our stay in this delightful place, and we turned our steps homeward wishing that we could spend a month in the pure mountain air and among the grand old trees which give a sense of rest and quiet very different from the excitement of the valley of the Yosemite, and a great relief after them.

We reached Murphy's that evening, and, leaving early the following morning, passed through Vallejos, Angels, Altaville and other small towns, reaching Milton and railway travel shortly after ten in the morning.

## An Interesting Route.

This trip is one which should be of great interest to the Eastern or foreign tourist, who is anxious to see as much as possible of California in a short time. It embraces some of the most interesting of the gold diggings, once so thickly populated and so fabulously rich, and one can still see enough work going on to understand the general operation of gold washing. Here are laid many of the scenes made famous by the pen of Bret Harte. Who does not remember the abrupt and disastrous termination of the society upon the Stanislaus, as related by Truthful James, of Table Mountain? It embraces two of the greatest wonders upon this coast, and enough of lesser interest to profitably occupy two weeks, more or less. The hotels are well kept, and careful of the comfort of guests, and the stage company certainly does all in its power to prevent delays and annoyances, and the kindness and courtesy of proprietors and employees, goes far to relieve what is at best a hard trip.

## Solution of Silver in Hypo.

The statement that silver chloride dissolves in a solution of calcium hyposulphite is not strictly accurate. It is decomposed, exchanging constituents with the calcium salt, forming calcium chloride and silver hyposulphite. The latter combines with another portion of calcium hyposulphite and forms a double salt, silver calcium hyposulphite, which is very soluble in water.

Mr. C. H. Aaron, in his "Leaching Gold and Silver Ores," says that if calcium pentasulphide is added to such a solution in equivalent proportion, one-fifth of its sulphur combines with silver to form silver sulphide, which is precipitated, together with the remaining four-fifths of the sulphur. The oxygen, and so-called hyposulphuric acid, which were combined with the silver, combine with the calcium of the decomposed precipitant. Thus the portion of the solvent which was decomposed by silver chloride is reproduced.

From this it follows that, for every atom of silver extracted from the ore, and precipitated by polysulphide, the solvent gains a molecule of calcium chloride, without, however, having ultimately lost any hyposulphite, and this is the reason why the density of the solution ceases to be an index of its solvent power. So far there is neither a loss nor a gain of calcium hyposulphite in the dissolving solution, but, as stated elsewhere, the precipitant always contains a quantity of that salt in watery solution, which being added to the solvent, increases its volume without impairing its strength, unless the precipitant is too much diluted.

In practice the increase or diminution in strength and volume of the solvent depends on the care exercised in saving as much of it, with as little addition of wash water as possible, and in having the precipitant sufficiently concentrated. Kustel gives 6° Beaume, as a minimum density for the latter.



## Road Laws.

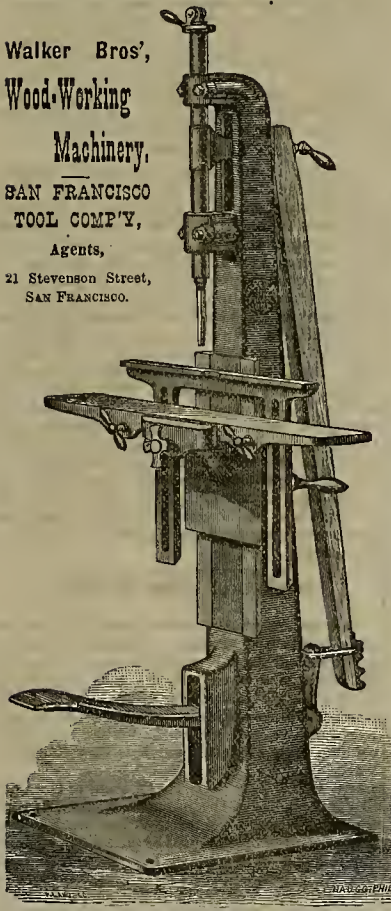
One of the special subjects set before the last Legislature was the enactment of a general road law. They framed such a law, but it was so liable to place city property owners under the feet of jobbers and robbers that the Governor promptly vetoed it, and the Legislature was content to let the thing die. It ought not to be a hard task to devise some system by which our State could have good roads without endangering the property of those who dwell on city streets. There are, however, so many designing men waiting to get their hands on other people's money, that it seems hard to make any proposition for the general good, without leaving loop-holes through which private greed may enter to the public detriment.

It seems now that so far as road making is concerned we return to first principles and are able to act only under the old provisions of the Code. The *Contra Costa Gazette*, in reviewing this subject says:

The road law passed by the previous Legislature for application to counties of the "second-class," and which, since its passage, has been assumed to be the law applicable to this, as being one of that class, is probably unconstitutional in not having been made of general application. The question of its constitutionality has not, it is true, been determined, as it has not been brought before the courts. There can, however, be little doubt that when it is it will be declared invalid. It is safe, therefore, in our county administration of road affairs, to assume that we have really no valid road law but that enacted and made specially applicable to the county before the adoption of the new Constitution, and which, under repeated rulings of the Supreme Court, remains in force until altered or repealed by some valid enactment of the Legislature. The special law referred to, is, in all its essential features, identical with the general road law of the Political Code, and there is no action called for here in road matters that may not be taken in conformity with the general code provisions, so far as any question of its validity can be raised.

The remarks above are made with special reference to Contra Costa county, but will apply to most of our leading interior counties. As there will be no session of the legislature until 1883, the making of roads will have to proceed under previous methods and these should be used as far as possible, for the making of good roads is the key to the development of our State, and should not be disregarded.

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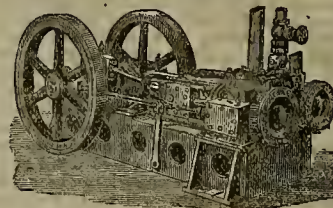
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### The Telegraph in the Arctic.

(Read before the California Academy of Sciences by JAMES GAMBLE, General Superintendent Western Union Telegraph Company.)

A few weeks ago I made a suggestion that the telegraph be used in Arctic explorations. The views I expressed in relation to the matter were published in the *Evening Bulletin* of this city. They have elicited considerable attention and a good deal of comment, particularly in the East. The plan I proposed was in substance as follows:

To use light steel wire, say number 20 gauge, weighing about 20 lbs. to the mile. The wire, coiled on reels, could be hauled on sledges, either by men or dogs, over the snow or ice, paying it out as the advance exploring party went along. By this means the party would keep in constant communication with their base of supplies. They would have no cause for uneasiness about getting lost or beyond means of rescue, as they would be able at any moment to call for aid. With this feeling of the certainty of relief in case of accident, they would not hesitate to push their explorations, to a distance far beyond what would be considered safe in the absence of means of telegraphic communication with the main body. And should any accident happen to the advance party of explorers, or should they require a further quantity of supplies, the line of wire would serve to guide those going to the rescue straight to the spot where the explorers were camped. It would also serve as a guide for their return, materially lessening the chances of danger to life and loss of the party. Having established a base of supplies at some central point there would be nothing to prevent several exploring parties being sent out at the same time in different directions, they reporting each night to the central station the progress and observations made during the day. Directed in this way, the practicability of one route over another could, from the telegraphic reports sent in, be determined upon and much time that would otherwise be wasted in vain endeavors to make way over barriers of ice be saved.

As hard frozen ground, dry snow or ice, is a perfect insulator, no poles to string the wire would be required. It could be paid out on the snow or ice by the party as they went along. The generally accepted theory of those familiar with the Arctic regions, is that the ice is seldom more than six or seven ft. in thickness—Captain Hooper, in his report, corroborates this—so that by boring through it with a common drill, or through frozen ground, there would be no difficulty in obtaining a good ground connection to complete the electric current. It would not be necessary to carry any battery material. One main battery at the central station would be all that is required. For a distance of 100 to 150 miles telephones could be used, dispensing with practical telegraph operators. Still, it might be advisable to have some of the party possessed of a practical knowledge of telegraphy.

At 20 lbs. to the mile, 100 miles of wire would only weigh 2,000 lbs. It could be wound on reels in size easy to handle. The cost of steel wire of that gauge is about 20 cents a pound, so that the total expense, including cost of reels, winding, etc., would not exceed \$1,000. Among those who have been good enough to notice my suggestion and manifest an interest in it, is Mr. George Kennan, of Washington, a gentleman familiar both with the telegraph and the Arctic regions, having been connected with the Collins Overland Telegraph Co. He assisted in the building of that line during the period of construction and afterwards made a journey through Siberia. In a long letter to the *New York Herald* of May 26th he enumerates a series of difficulties that stand in the way of any profitable results being derived from the use of a telegraph wire in the polar regions. His objections to the practicability of the scheme are founded as he himself states "on the inadequacy of existing transportation facilities."

It possibly may not have occurred to Mr. Kennan that an inventor, to realize his idea, does not content himself with such means or facilities as may exist, but will provide himself with those necessary to its realization if such are to be had. He says, "I understand that Lieut. Berry does not expect to take more than 25 dogs from Petropavlovsk on the *Rodgers*." If I had used only 25 men in the construction of the overland telegraph line, the probabilities are that the overland line would not be finished yet. The poles at one end would have had time to rot away before the poles at the other end could have been set. If only a sufficient number of sledges and dogs are used to carry the necessary provisions for the party, then, clearly, there will not be room for anything else. But if more dogs and sledges are used—even Mr. Kennan admits this—there would be room to carry something else besides food for the party.

And in connection with this point, he overlooks the fact that, as the exploring party advances, the load of wire is every moment becoming lighter. It is lightening up at the rate of 20 lbs. to the mile, and if the party make two miles an hour, they are unloading 40 lbs. an hour. Within a week, 100 miles of wire would be paid out. If they started out with 200 miles the different sledges could unload in part alternately so that after having accomplished 100

miles, each sledge would only be carrying a half load. When again, some had entirely unloaded they could return to the base of supplies, the wire being their guide back.

"But," Mr. Kennan says in another place, "100 miles of wire, even if it could be carried without sacrificing every thing else, would be of very little use." That, in one sense, is a mere assumption, in another, it is incorrect. One hundred miles of telegraph would have been the means of saving many a life sacrificed to Arctic explorations. Ten miles is a very long distance in the Arctic regions, more than sufficient to prevent a famishing explorer returning to his party. To show the uselessness for exploring purposes of 100 miles of wire or more, Mr. Kennan cites Lieut. McClintock's journey in 1853, of 1,200 miles, made on sledges with a party from the *Resolute*. Had Lieut. McClintock pursued this journey in anything like a straight line, he would have gone over the North Pole and down the other side. But as he did not do this, it is proper to suppose what in fact is a reality, that the 1,200 miles represent his wanderings forward and backward, hither and thither, on the ice between his leaving and return. The instance therefore cited by Mr. Kennan of 1,200 miles having been traveled and so little accomplished, so far as reaching a higher latitude is concerned, is a strong argument in favor of a telegraph wire. With it Lieut. McClintock and others who have succeeded him, would not have wasted so much time nor incurred so many risks to themselves and parties.

In point of fact, several hundred miles of wire could be taken as easily as 100 miles, the requisite number of sledges and dogs being provided—and without any difficulty whatever. Mr. Kennan says again: "It is very doubtful whether a steel wire of number 20 gauge could be unreeled from a sledge in a temperature 50° below zero without snapping at every turn of the reel." The doubt here expressed seems at first sight a reasonable one. I have, however, supplemented my own opinion on this point with that of one of the best authorities here on the effect of cold on metallic substances, and especially the effect of a very low temperature on iron, steel and other wires. Under intense cold hardened steel is undoubtedly rendered extremely brittle and will readily break when subjected to a blow. But steel wire can be annealed to a degree making it as soft as iron wire, and as easy to handle from a reel in northern latitudes as in warmer ones.

It should also be remembered that the uncoiling is not a snappy or jerky movement. It is not uncoiled any faster than the progress made by the party, and which is about two miles an hour. Moving forward steadily and not faster than two miles an hour, annealed wire could be uncoiled without any trouble or danger of snapping off.

Even in the event of a prejudice existing against steel wire, copper wire could be used. In suggesting steel, I did so simply because of its greater strength and cheapness. But did such a danger exist, as supposed by Mr. Kennan, of the snapping off of the wire at the turn of the reel under a low temperature, how was it then that the wire for those portions of the telegraph line built across Northern Siberia towards Bering strait, to connect there by means of a cable with the Collins overland line on this side was uncoiled? Several portions of that Siberian line were built and the wire strung during the winter, with the thermometer ranging down to 50° below zero, Fahr. The line running along the head waters of the Anadyr river and along the Okhotsk sea was also built, the wire uncoiled and strung during the winter months. It was the only time of the year, in fact, it could most successfully be done, it being difficult to haul the loads of wire over that part of the country, owing to the wet and swampiness of the land during the other periods of the year. Col. Bulkeley, Chief of the Collins overland telegraph expedition is my authority for this statement. That part of the line from Plover bay to Bering strait was also built during the winter. These are facts that Mr. Kennan ought to be familiar with and which, had he recollected, would have prevented him advancing such objections as he has.

Mr. Kennan is a most intelligent gentleman, but I cannot help thinking that his observations on this subject are mainly the result of his imagination, and not of practical experience in regard to the utility or inutilty of a telegraph line in Arctic explorations. You will recollect that when an overland telegraph line was first proposed in Congress it was considered impracticable. Among the earliest suggestions made was one by the Hon. Stephen A. Douglas, and notwithstanding that his plan was clearly elucidated, it was still considered an impossible scheme. The objections raised against the possibility of the construction were: Difficulty of transportation, scarcity of timber along the route, difficulty of protecting the line from Indians, and many others equally plausible and apparently well-grounded by those who made them. But in the face of all these objections and difficulties there were some who were willing to try and willing to risk their money in the construction of such a line. I need not ask you if they succeeded. You, who read in your newspapers, morning and evening, the dispatches from all parts of the world, know that they did. But it should be remembered that they not only did succeed in constructing an overland telegraph line, but that through it they also succeeded in establishing the weakness and worthlessness of all the different arguments and objections raised against it when

the idea was first suggested. But neither one nor the other would ever have been established had not a trial been made, and that is precisely what should now be done in respect to a telegraph wire in the Arctic regions.

The idea I have suggested is, I think, sufficiently important to merit a practical experiment being made. This can be done by Lieut. Berry, commander of the *Rodgers*, who honors us with his presence here to-night, and who is about to risk his own life and the lives of others in search of those who left on the *Jeannette*. If steel wire is rendered too brittle by the extreme cold, then try copper. There will not be any strain on either as strung out on the ice and there will be plenty of slack to allow for contraction. I can well understand that the greatest difficulty will be the transportation, but it is not worth while to make an effort to overcome this in order to better ensure the safety of the lives of the brave men who undertake the perilous task of exploring that unknown region? It will be impossible, from want of time, for Lieutenant Berry to have prepared a proper outfit for several hundred miles of wire. I would therefore respectfully suggest that he take with him a few miles of three different kinds, say 5 or 10 miles of steel annealed, iron, and copper wires, so as to try, during next winter, the effect of the cold on each. Telephones should also be provided, so that a practical experiment could be made of securing the necessary ground connections, etc.

Theory is not always correct; practical experiments furnish the most satisfactory proof of what can be accomplished, and the opportunity is now afforded to determine whether the telegraph can be utilized to aid in exploring the Arctic regions.

### The Gold Gravels of North Carolina.

(Read before the American Institute of Mining Engineers by W. C. KNAAB, State Geologist, Raleigh, N. C.)

When Agassiz and his party of geologists commenced their exploration of the interior of Brazil and the Amazon region, one of the first and, to the last, one of the most novel and striking phenomena which met them everywhere was the great depth of decomposed or partially decayed rock *in situ*, which mantles, and for the most part conceals, the underlying strata. The same facts strike all geological observers from the North who happen to penetrate the middle and southern latitudes of their Atlantic States. In North Carolina, *e. g.*, the entire middle and western regions, outside of the quaternary clays, sands and gravels in the east—that is, all that portion of the State occupied by the Archean and Mesozoic rocks—show everywhere this peculiarity, so new to those accustomed to glaciated surfaces. Not only do the hills and slopes, the mountain chains and spurs, present everywhere to the eye this superficial covering, but even the more level tracts and the valleys. The railroad cuts give very good exposures of this covering, and furnish, everywhere, abundant opportunities for the study of its structure and history.

Some of the more obtrusive facts are these: The thickness of this covering varies from a few ft. to 30 or 40, and often 60 and 75, and even 100 ft, and bears an obvious relation to the character of the underlying rock, being least where this is most refractory, and *vice versa*; the rock is generally near the surface in the crests of the hills. The upper portion of this earthy envelop for several ft. beneath the soil is homogeneous and structureless; but lines of structure soon make their appearance, becoming more pronounced with the depth. These lines of structure are commonly coincident with bands and ribbons of differently colored earths, which, on closer inspection, show differences in their materials also, these differences becoming more and more strongly marked as they are traced downward, until they pass by insensible gradations into the solid rock beneath. The obvious and necessary conclusions from these observations gives itself, viz., that the rocks of the region are and have long been undergoing a slow chemical decomposition and disintegration from the action of atmospheric forces, this decay being too rapid, however, to be overtaken by the abrasive and transporting power of these same agencies.

So far the general and obvious facts, plain to be read by the man that runs. A little closer inspection reveals another set of facts.

It is easily discovered that these mantles of earth and half-decayed rocks are not strictly *in situ*, but have been subjected to some sort and degree of movement, and that the materials have undergone at least a partial rearrangement in certain situations and under certain conditions. In general on the summits of the hills there has been no change, but descending the slope, however gentle, a tendency to a sorting and arrangement of materials appears, and this becomes more observable with the distance. At first the fragments of quartz and other hard rocks are sharply angular, and are distributed equally and irregularly through the mass, or in lines corresponding to the bedding of the rocks. Descending a few rods the rock fragments have "settled" somewhat; they are found more thickly strewn towards the bottom, and are less angular. Descending still further all the coarser fragments are found accumulated in a layer of cobbles or pebbles, with only the interstices filled with earth and gravel.

The obvious interpretation of these facts is that there has been a movement or flux of the earthy mass in the direction of the slope.

The difficulty at once arises how to account

for a flow of such materials with such results. The ordinary action of flowing water is, of course, excluded. The mere action of gravitation will not account for the phenomena—slipping or sliding down hill. This, doubtless, often happens on very steep declivities, but such cases are quite exceptional and are easily distinguished. The movements we are considering have taken place at every degree of inclination, from one degree and less upwards, and occasionally on a level, or even up hill.

After puzzling over these phenomena for half a dozen years, and wondering that there is no explanation in the books, or even any discussion of the subject or note of the facts, not even in Gerkie's *Great Ice Age*, it occurred to me that the only possible solution must be sought in

### The Action of Frost.

The alternate freezing and thawing of such a mass of earth must needs produce just the effects we have been considering. The earth, saturated with water, in the process of consolidation under the action of cold would, of course, expand just as if it were all water, and in thawing there would be a slight movement of the parts and particles of the mass *inter se*, and of course a settling of the heavier fragments; in other words, the movement would be the same in kind (though not in amount) as that of a glacier. These masses may be considered earth glaciers. And I have ventured to denominate this group of phenomena, and these peculiar superficial accumulations, *frost drift*. Now the ordinary glacial phenomena are wanting in North Carolina, with, perhaps, the exception of a few moraine ridges in the gorges of the higher mountains. But during the glacial period, of course, the cold must have been intense enough to account for the depth and extent of action which the theory of *frost drift* supposes.

I was led to these results from the particular Study of Gold Deposits

Of the State. They have all been formed in this way. There are probably 500 square miles of gold drifts in North Carolina. They are formed through a range of 400 miles east and west, from the lower waters of the Roanoke, near Weldon, to the extreme western border, the county of Cherokee. And they belong to all the different subdivisions of the Archean rocks of the State. The two most extensive deposits are found in the middle region, on the Yadkin and Catawba rivers, among the low ranges and spurs of the mountains. The shistose and slaty rocks, highly inclined and much contorted and dislocated, are in many places penetrated by innumerable small veins and seams of gold-bearing quartz. In the disintegration and breaking down of these rocks, and the movement of the *debris* in the manner described, it is evident that the gold particles, with the heavier crystalline minerals, will be found accumulated near the bottom of the drifts, on or near the surface of the bedrock, or "slate," as the miners call it.

### The Gold Mining of Modern Times

Began 60 years ago in this region from the accidental discovery of a 23-lb. nugget by a boy in one of the streams of this region. Most of the simple and effective appliances now in use everywhere for the separation of gold from such deposits—the long tom, the sluice, the riffle-box, etc.—were devised and used in this region, and were carried hence to California when, 25 years later, the trained miners of this region emigrated in a body to that newer and richer field. Since that emigration there has been but little placer mining done in North Carolina. Still this sort of mining has never entirely ceased, and in some sections, and by a few families, it has been followed continuously to the present. The richest deposits within reach of water have been worked over, but there are large areas still untouched, because inaccessible to water without considerable outlay for ditching, canalizing and fluming, to which neither the capital nor the enterprise of the region is equal.

### Buhr Millstone.

This valuable mineral has been found at several localities in the State; one examined by the State Mineralogist a number of years ago is a small outlier in Owen's River valley, Inyo county, known as "Little Butte," which is a prominent landmark on the line dividing Russ from Inyo mining districts. It lies partly on section 13, township 13 south, and range 35 east; and partly on section 18, same township, range 36 east. The stone is hard and brecciated, somewhat resembling the celebrated French buhr stone. A sample has been placed in the State Museum. Dr. J. B. Trask, first State Geologist of California, says in his first report that it is found in great abundance on Pit River—now Modoc county—extending to the north of Goose lake. The following quotation shows what importance he attached to the discovery. Its admirable adaptation to milling requires no comment. The value of this rock cannot be too highly esteemed in this State, where the prospective is so flattering of its becoming a grain growing country equaled by few on the Atlantic slope. The heavy expenses that are now incurred, and the future wants of the State in this particular, will be obviated, and our dependent condition on foreign import destroyed. These rocks have as yet attracted little notice, but the rapidly increasing wants of the State will ere long bring them into requisition.

The Sunday law was enforced at Biggs, Butte county, all the business houses being closed.







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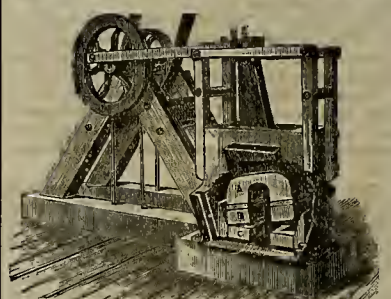
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The California and Oregon railroad traverses nearly the entire length of the tract. There are several sections, stations and switches, besides depots at the towns of Anderson and Reading, all of which are located within the limits of the ranch.

The Sacramento River borders the whole tract on the southeast. Its clear waters are well stocked with fish. Good hunting abounds in the surrounding country.

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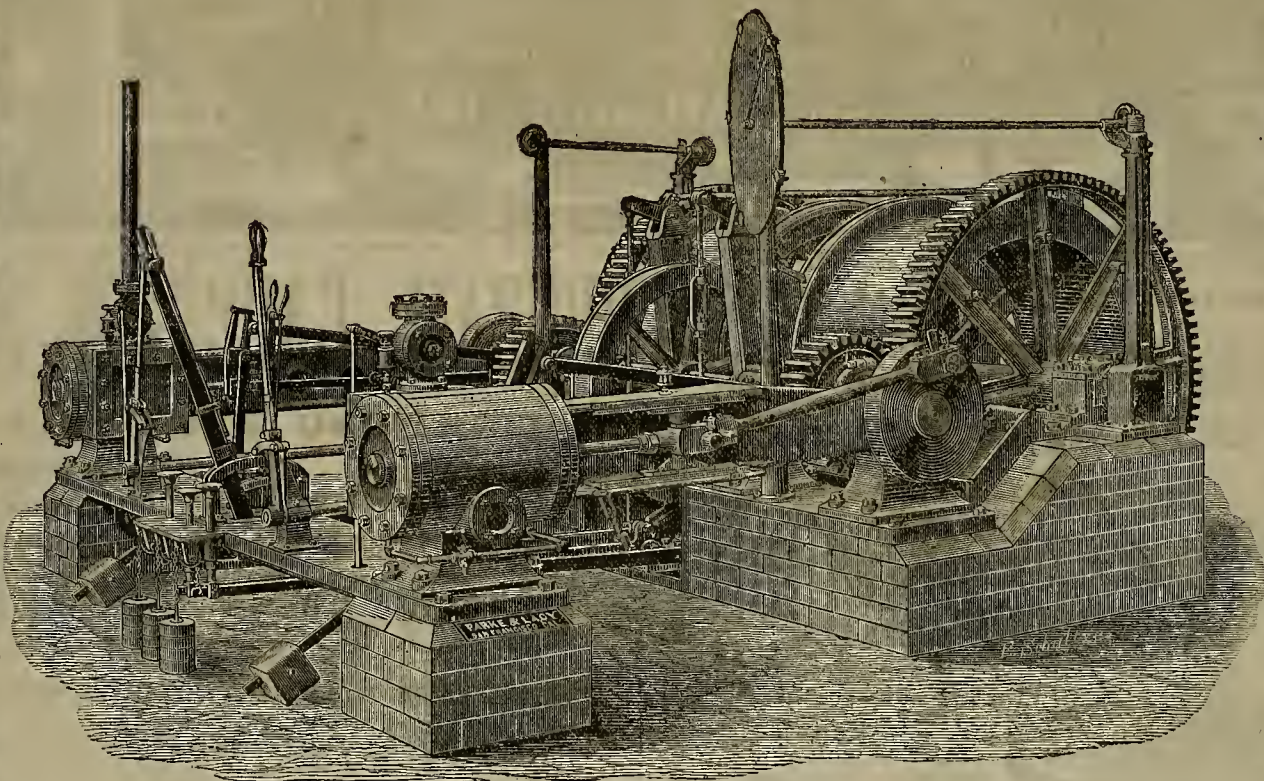


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SAN FRANCISCO, SATURDAY, JUNE 18, 1881.

VOLUME XLII  
Number 25.

## Mining Statistics of Counties.

The Mint Bureau of the Treasury Department has authorized the Superintendent of the Mint in San Francisco to collect statistics of the production of the precious metals in the States and Territories of this coast. In accordance with this authority, circulars asking for information will be sent to every incorporated and private mine; to Wells, Fargo & Co.'s agents and to prominent merchants in mining localities for estimates of the production of the Chinese, small producers by arrastras, the pan, etc., by which means it is hoped to receive returns of the entire production.

Circulars are sent from the Mint every six months—Jan. 1st and July 1st—for the reason that the production of the government fiscal year which ends June 30th is six months each of two years.

The productions will be classified as to the manner or mode of production—whether argentiferous, lead ore, vein quartz, drift, placer, or hydraulic, etc. But what will be of most advantage to every county will be the publication for each fiscal year of the production of the precious metals for each county—only, however, in the aggregate or the totals. Individual returns will not be published, and are seen by no one but the Superintendent and his assistant, the statistician in charge, by whom any communication relative to the production of a mine will be safely guarded.

This publication of the yield by counties will be of benefit in attracting the attention of men of means who are each week arriving in San Francisco from all parts of the world, and who are often imbued with the desire to invest in mining property—of which we have so much awaiting the advent of capital—and who will naturally look for statistics of the production of gold and silver, and will in many instances go to those localities known to be productive. They can by this means often be induced to invest, and will thus help develop the main industry which has been the means of making us noted to the world.

It is therefore hoped that every mining company, large or small, and every person receiving a circular of inquiry from the Mint, will promptly and freely make returns of productions, and impart such information as will give each county full credit for all it is entitled to, and by this means assist in aiding the mining industry of our country.

If local papers in mining counties will insert this article, or something similar, to call attention to the matter, it will do much to further the work and assist in bringing to notice more prominently the mines in their own localities.

## Our Railroad Industry.

The completion of so many new railroads in the country is making it busy times for the car builders. One company alone, in Boston, Massachusetts, whose business last year amounted to over \$1,000,000, has double the number of contracts it had then.

The Baldwin Locomotive Works completed 513 new locomotives in 1880, and rebuilt 17 more, making a total of 530 during the year, besides doing a large amount of other work during the same period.

The manufacturers of standard locomotives in the United States have orders enough to keep their works busy during the entire year. The railroad companies cannot get locomotives as fast as their travel and traffic requires, notwithstanding the works are being driven to their utmost.

Mexico is entering upon a new class of revolutions, and is undergoing a wonderful transformation at the hands of American enterprise and capital. It is estimated that in the incredibly short space of seven months \$68,000,000 has been invested in railways and mining enterprises from the United States.

About the first of March four trial locomotives were shipped from the Baldwin Locomotive Works to the Mexican National Railway, a bid to supply the road with 200 engines having been tendered some time before. A contract for the proposed 200 has since been signed and the work of construction has been begun.

## The Pacific Copper Smelter.

No class of mines in the great and practically unlimited mineral zone of this western continent are now attracting so much attention as those of copper and argentiferous galena. The mechanical appliances for the treatment of these ores have been so much improved of late as to greatly cheapen the cost of production, largely enhance the value of all such properties, and make available a great number of mines carrying a

interruption, and a continuous use of many years with but little cost for repairs. Among other obvious advantages claimed for this style of smelting furnace is that, as shipped, it is complete and ready to set up—no brick or stone work being required in its construction. This saves great expense and loss of time, as most places where such works are put up are destitute of any material or facilities for mason work. No tuyeres are exposed to the fire, and the distribution of the blast is such as to avoid dead centers, prevent any tendency to freezing and

smelter. We venture the statement that it would be hard to find a copper mine in all the mineral range of the country that would not go higher than this, while it is a well-known fact that there are in Arizona, New Mexico, Colorado and Nevada vast deposits of copper ore that will average from 8% to 12%, and a large number of mines that will give twice as large a percentage. It will thus be seen that with such approved appliances for reduction no field of mining venture offers more promising returns.

The Pacific Iron Works are making smelters on this plan adapted to argentiferous galena ores, and have a large number working with results equally satisfactory. The firm have long made a specialty of this class of machinery and have worked out the details of their furnace plants with a care which shows the closest study and observation as to the requirements of this class of work. Their success in handling these ores has undoubtedly greatly stimulated exploration and development in this class of mines—the products of which are already attracting much attention in the principal metal markets of the world.

## Industrial Progress.

The United States Treasury reports for the last few years are deeply interesting. For the year ending April 30, 1881, our exports, dealing in round numbers only, amounted to \$912,590,000; while our imports for the same time were only \$654,550,000, showing a balance in our favor of \$258,040,000, against an excess of only \$178,460 during the previous year. The excess of coin and bullion received for year ending April 30, 1881, is \$92,680,000, against \$76,296,000 for the previous year. It is thought that the excess of exports during the present fiscal year will exceed those of last year by fully \$50,000,000. The amount of precious metals held in this country now is greater than any other country on the globe except France.

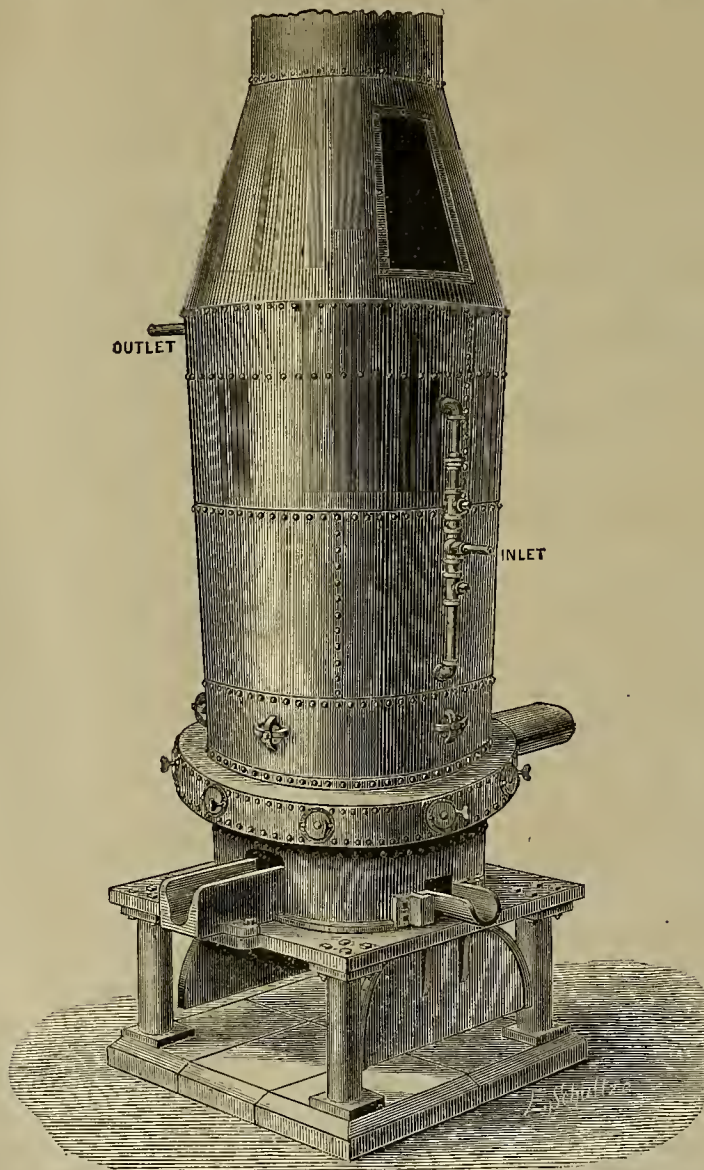
Under the protective system we have learned to manufacture a great number of articles formerly imported, while in many articles we are now able to ship abroad and compete with the most advanced nations of Europe. The first manufactory of translucent porcelain in the United States has recently been established at New Orleans. We have but just started in the plate-glass business; but we already number six factories, with 134 pots. The home manufacture is rapidly growing in favor, and will soon drive the foreign article out of the market. Indeed, this trade is everywhere just now in a transition state, which must, sooner or later, end in the "survival of the fittest." In this contest American manufactures will not be found at the bottom.

The watch trade of the country now amounts to about 3,000 watches a day, of which number our seven leading factories furnish about 600. There are quite a number of smaller factories, from which we have no reports. The importation of watches is constantly falling off; while many of our home-made find a market in India, South America, etc., in competition with European makers. Our mechanics have effected a revolution in this business by the introduction of new and superior machinery.

Our iron industries were never more prosperous than now. Our steel rolling mills have orders for all the rails they can manufacture for several months to come. We are also making decided progress in iron ship building. At a recent meeting of business men of Bath, Me., \$100,000 was pledged for an iron ship-yard, and a committee was appointed to raise \$200,000 more by subscription. Over 1,000 printing presses have been shipped from Philadelphia to France since the Centennial.

A paper manufacturing firm in Pennsylvania has purchased 20,000 acres of timber land, the timber upon which they propose to convert into paper pulp.

About two years ago pine straw, or leaves, became an article of trade in the Wilmington, N. C., market, and now it is impossible to supply the demand. Shipped North it undergoes certain preparations, and is then used for stuffing mattresses and for other purposes.



THE PACIFIC COPPER SMELTER.

lower grade of ore, that could not heretofore be worked with profit. The smelting furnace shown on this page represents an improved style of water jacket copper smelter, built by Messrs. Rankin, Brayton & Co., of the Pacific Iron Works in this city. It embraces many features that are entirely new and of great practical utility. From evidence at hand we are satisfied that no other furnace can compare with this in economy of working and capacity for continuous and uninterrupted work.

All practical smelters know that the loss of time in shutting down for repairs required for most furnaces is the great drawback to effective and economical work. It is claimed that with ordinary care from six to 12 months' runs can be made with this furnace with little or no

secure perfect combustion, thus insuring the greatest possible economy of fuel. The arrangements for drawing off the slag are such as to secure a clean and high grade of bullion.

Large numbers of these furnaces are working in all parts of the coast with the most satisfactory results. The most notable success in this way, perhaps, has been the Copper Queen works, at Bisbee, Arizona. This company, with one of these 30-ton smelters, has turned out in six months, 1,200 tons of bullion, averaging 97% fine, and developed a property only second in value to the famous Calumet and Hecla.

Under favorable conditions as to fuel and water, ore averaging not more than 4% to 5%, it is said, can be worked with profit by this



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

### Fresno County Mines.

#### A Description of the District and the Mines.

EDITORS PRESS:—Perhaps no part of California is less known to the outside world as a mining section, in comparison to the amount of gold produced, than Fresno county. It is a fact that comparatively few mining sections gain more than a temporary reputation with nothing but placer mines, upon which that reputation is founded. Placer mines, though often very rich, rarely create more than a temporary excitement, and Fresno county is little known to mining men, for the reason that it is only within a very few years that quartz mines, the only really solid basis upon which a permanent reputation can be laid, outside of a few gravel mining sections, have been prospected and worked. Fresno county, although contributing her portion of dust from nearly every gulch and ravine in the Sierra, from the palmy days of '49, when "ounce diggings" were often left for something better, down to the present, when the Mongolian rocks out four hits to one dollar "paw," and sometimes more, per day, has been no exception to this rule.

It has been only two or three years since that quartz mining was placed upon a paying basis, and of course, no very extensive development of mining properties has been made. In mentioning the mining properties Potter's Ridge district, Fresno county, I shall endeavor to speak of those only which have paid dividends, where reduction works are in operation, or which promise to be paying mines as soon as reduction works are erected.

#### The Most Noted Mine

Of the district, and about the only one which has more than a local reputation as a dividend paying property is the Fresno Enterprise mine, which is situated on the northeast slope of Potter's ridge, a spur of the Sierra Nevada mountains, from which the district takes its name, 5 miles from Fresno Flats, and 50 miles from Madera and Berenda. The course of the vein is nearly northwest and southeast, dipping to the southwest near the surface, and at a depth of 150 ft. assuming a nearly vertical position with a slight dip to the northeast. The formation is slate. The highest outcroppings of the vein are near the "Point of Discovery," some 1300 ft. above the Fresno river which flows by the base of the ridge. Since the present owners have had the mine, only two years, the following developments have been made: Four tunnel levels, two incline shafts, many winzes, crosscuts and intermediate levels have been driven, which, if in one continuous line, would make a tunnel more than one mile in length. The north tunnel level commences 200 ft. from the northern boundary line and follows southeasterly along the vein a distance of 510 ft.

The upper tunnel level commences 500 ft. from the southern boundary line, and follows the vein a distance of 150 ft., showing a vein one to two ft. thick for the entire distance, rich in free gold. The prospecting tunnel is 150 ft. north of the southern boundary, and follows the vein in a south-easterly direction for 100 ft. This level also opens a chimney of high grade ore. The tunnel level is near the center of the location, and is about 400 ft. in length. Three hundred ft. from the mouth of this level, a crosscut is being pushed to intersect the shaft sunk from the upper tunnel level. It is 125 ft. in length, and the work is progressing. About 200 ft. southeast from the mouth of the north tunnel, is the Baker incline shaft, which is connected with the north tunnel level at a depth of 100 ft.

An intermediate level was run from this shaft at a depth of 40 ft.; the southeast branch following the vein a distance of 200 ft., and the northwest branch extending to the surface, a distance of 80 ft. The former branch of this intermediate level is connected with the north tunnel level by several winzes, and two up-raises have been pushed from the north tunnel, from north of the Baker incline shaft. From the north tunnel level two shafts have been sunk to, and below the water level. Forty-six feet from this level an intermediate level extends along the vein a distance of 350 ft., connecting the two shafts. It is from this level that the richest rock is being taken out and crushed now. The last crushing of which averaged \$163 per ton.

Another incline shaft, situated near the center of the claim, intersects the upper tunnel level, then follows down the vein a distance of 108 ft. Tunnel level No. 2, at a point below the Baker shaft, will cut the vein at a depth of 120 ft. below the north tunnel level. This tunnel is in 120 ft., and the work is being pushed to completion. Although it takes the reader only a few moments to scan this account of these developments, I can assure him that it took me very much longer to see them.

Messrs. Haley, Fairbanks, Meyers and Sheehy are the principal shareholders of the stock of the company. Under the supervision of Mr. John Haley as Manager and Dr. M. J. Goodfellow as Superintendent, the sum of \$200,000 has been taken out of the mine in two years,

which, considering the primitive method of reducing the ore, is, to say the least, encouraging. Of this \$200,000, \$125,000 have been paid to the stockholders in dividends, and the remainder has gone for expenses and development of the mine. The reduction works consist of three arastras.

Until a year ago only one arastra was in operation. About a year ago the second arastra was built, and in May the third arastra was completed. Since then the three arastras have been grinding. The crushing capacity is about 100 tons per month. The arastras are run by water power and go day and night. The last rock crushed averaged \$163 per ton, but of course the rock was assorted. The gold is very fine and returns from \$20 to \$20.20 per ounce.

Leaving the enterprise, we cross the Fresno and follow down the river over a rough mountain trail till we reach Indian peak, which we cross and arrive at the place which bears the now euphonious but suggestive name of Grub Gulch.

In this gulch and on the ridges which rise above it, several promising prospects have been found. The mines of this section are recent discoveries, and instead of calling them mines I shall call them prospects. I think the word mine ought to be reserved for those properties which having been fully tasted are found permanent and good.

#### The Best Developed Prospect

In this vicinity is the Surprise, owned by John Gilman, and at present bonded to Sunderland & McDonald for \$6,000. Several shafts have been sunk on the vein, the deepest being 120 ft. The vein is near the gulch, and at this depth the water causes much inconvenience to the prospectors. The formation is slate. The vein is seven feet thick, with no waste in the vein matter, and has well defined hanging and foot walls.

#### Other Mines.

Near the Surprise is the Gambetta, owned by Dr. M. J. Goodfellow, Superintendent of the Enterprise, which is a very flattering prospect. The formation is the same as the Surprise, but the vein is much smaller. Some very rich rock has been taken from the mine. Mr. D. Walsh, a mining Superintendent of 20 years' experience is superintending the prospecting of the property.

The Hancock, owned by Anderson & Bronson; the Defiance, owned by Bronson & Melon; and the Red Rover and its extension, the Antelope, a recent discovery, are all good prospects. The Antelope is owned by Biegle & Peterson, and the extension by Messrs. Hale, Slumlick & Zoeller. The vein is from two and a half to three ft. in thickness.

In my next I shall mention the mines of Coarse Gold Gulch and vicinity.

SAMUEL L. HOGUE.

Fresno Flat, Cal., May 26th, 1881.

### Amador County Mines.

EDITORS PRESS:—I have just returned from a tramp among our quartz mines, and it occurred to me a few items of interest would no doubt be appreciated by the readers of your very valuable paper. I presume you are well aware of the legal troubles existing between the Empire and Pacific mines at Plymouth. I found on my arrival at the mines the 40 stamp pounding away on a fair grade of ore from the Empire; the other 40 idle since the contract has expired with the Pacific Co. for crushing the ore from the latter mine. Since my last visit I find a change in the management of the Empire. It seems to me there was a sufficient force of officials before the change took place. At present I find one superintendent, one assistant, one foreman, one or more shift bosses; and what need for the addition, I fail to see. In previous administrations they had one superintendent and one foreman, which is quite sufficient, particularly when a mine does not produce sufficient to pay dividends. Well, that is not any of my business; it is the stockholders, and not I, who pay for the music.

I simply speak of this from observation. As to the proper handling of such extensive properties with economy, I consider that a mine of the character of the Empire, with such a vast amount of low grade ore, has to be worked with skill, and at the very lowest cost, in order to produce sufficient to pay its own way, let alone dividends.

The mine has its own water power, with a ditch large enough to float all the timber used in and about the mine, a 60-ft. head at mill with a double turbine wheel as a driving power for the 80 stamps. The Pacific mine has the finest and most complete hoisting works in the county.

The mine is in charge of Bill Jones, as foreman, formerly of the Empire, who gives entire satisfaction to his employers. Are making good progress in sinking their three-compartment shaft and expect to tap the ore body in 90 days. They have now an abundance, of good quality, and are preparing for a 40-stamp mill, to be erected within 90 days, with all modern improvements, to be driven by a burdy gurdy wheel—the water to be brought from the Amador canal, at Sutter creek. About 100 men are at present engaged in bringing the ditch to Plymouth, a distance of about 13 miles, four of which will be pipe.

I will give further particulars of the Pacific mine and mill improvements in a future letter,

In going south I find a few prospecting mines, such as the Hercules, on Dry creek, idle at present, but I understand have a good prospect for a paying mine. Lack of funds compelled the suspension for a time only. Potosi, under a new management, is about to start, with great hopes for the future. Maryland, farther south, is still prospecting, with a very long purse in England to draw from. Seaton, with one man in possession, is awaiting a U. S. patent, and, it is probable, some \$20 pieces to prospect this mine with. North Gover is idle and likely to continue in that condition for some time. The Gover mine will most likely start with renewed life in a short time; this mine is a good piece of property if properly handled. I am on my way to the Bunker Hill mine, and I shall report further in due time.

QUARTZ MINER.

Sutter Creek, June 6, 1881.

### Mount Baldy District, Utah.\*

[From our Traveling Correspondent.]

On Ten-Mile creek, near Marysville, Pinta county, Utah, are situated the Melakoff, Clara, Legion of Honor and Fairview mines, belonging to the Marysville G. & S. M. Co., of which J. M. Benedict is president, and Gen. C. H. M. y Agramonte, vice-president and superintendent. The Melakoff and Clara commence at the bed of the creek, running south. The tunnel on the former is 30 ft. above the bed of the creek and has been run 130 ft. on the vein, showing a fine body of mineral the entire distance. The average width of this ledge is about 11 ft., gold and silver-bearing quartz, which assays from \$15 to \$460. The assays shown me had all been made by Mr. F. M. Bishop, of Salt Lake City, who stands at the head of his profession in Utah. One hundred and eighty feet above the creek a prospect tunnel has been driven, showing the same class of mineral throughout, and 300 ft. still higher up, the company has commenced to strip the vein its entire length of 1,500 ft.

On the other claims considerable prospect work has been done, showing a rich body of mineral. There is an abundant supply of water, and wood enough to last for years. The company have about 400 tons of ore on hand.

General Agramonte is now erecting a Steen's Reliance ore battery, with a capacity of 12 tons per day, and a couple of Paul's Americanized arastras. The former is claimed to be the simplest ore crushing machine ever made which would do the same amount of work, and less liable to get out of order than the common cam mill. Each of these batteries, it is said, will crush as much ore to a given fineness as eight common stamps of same diameter of bead, and save 30 to 40% of the power, as the friction is very much less for each stroke, and each stroke is much more effective. The wear of came and tappets is also avoided, and no trouble about their getting loose, as there are none.

The improved arastra, which they are erecting, is an invention by which pulverizing, amalgamating and settling are done in one machine, thus saving the expense of several separate ones; so that with suitable crushing machinery, it will make, not only a cheap, but the most perfect and consequently profitable quartz mill.

North of these mines is the Mt. Baldy mining company's property, of which Gov. E. H. Murray is President. The Uncle Sam is their principal claim. The tunnel has been run about 75 ft. on the vein, showing rich ore all the way. Some assays have shown as high as \$350 in gold and silver. From this tunnel a shaft has been sunk to a depth of 110 ft., all the way in ore; so that the Uncle Sam promises to be one of the best mines in the vale.

Adjoining the Mt. Baldy group is the Rothschild mine, owned by D. C. Tate and Louis Leifer. The whole of the ground has been thoroughly prospected by tunnel and shaft; on the north side of the claim is a 150-ft. tunnel, showing very rich silver ore; on the south side is an incline shaft 40-ft. deep. This mine is being very handsomely worked, both Mr. Tate and Mr. Leifer being old and experienced miners.

Three miles south of Marysville, on Cottonwood creek, in the same district, is the Deer Trail mine, which has been more developed than any other mine in this vicinity. It shows a large body of low grade ore, running from 25 to 50 ounces in gold and silver, and a rich strike was recently made on this property. Above the Deer Trail is the Pluto, owned by Campbell & McNorton. It is very rich, principally in gold, but has been gophered out by men who only work it when they take a notion to do so. The Crystal is an immense deposit of smelting ore, averaging over \$100 per ton, and is owned by G. M. Scott and H. D. Converse. Haynes & Sheldon own the Clyde, and are now running a tunnel to tap the vein, which they expect to do at 800 feet. It has excellent surface indications for smelting and milling ores. The extension of the Clyde, owned by Ira Pfoutz and Richard Young, is very rich, and has over 200 feet of workings. They have plenty of ore on the dump, and some of their assays have run as high as \$600.

#### Ohio District.

The Ohio district at Marysville adjoins the Mt. Baldy district. The principal mine now being worked is the Fillmore, owned by C. B. Robertson, Recorder of the district. It is developed by a tunnel and a shaft, which is now down over 130 ft. Both are in milling and

smelting ores averaging 50 to 70 ounces silver.

The Copper Belt is a very fine mine, containing copper, sulphide of silver and hromide. Ore assaying as high as \$1,100 has been shipped for the last two years. This and the Sierra Nevada, situated on the other side of an almost inaccessible canyon, are owned by Hugh McCorkindale & Co.

A company, known as the Occidental M. Co., has just been formed by D. C. Tate, W. D. Wilson, and others, to work a newly discovered group of mines in this district.

The Bully Boy and Webster are owned by Haggin and Tevis, and it is reported that they will resume work on them this season.

The other leading mines of the district are the Beecher and Ferris, owned by John and Al. Ferris; the Sonoma, owned by Captain Timoney, and the Mountain Jaguar, belonging to General Agramonte. All are in granite or porphyry formation, and the ores are more or less refractory. A. L. M.

\* This report has been delayed some weeks owing to the accident which befell our correspondent since leaving Utah.

### Volatilization of Gold.

EDITORS PRESS:—In your issue of May 7th last, I note an article with the above caption, which appears to be taken from Mr. Aaron's late publication. I am backward to attempt to controvert the distinguished author, but it appears to me that the statements contained therein are of so extraordinary a character, and so opposed to the notions of chemical writers, that a great deal of criticism is sure to be evolved. The gentleman's investigations, as recounted by himself, were very ingenious in their way, but let me ask, why did he leave off with the accumulation of so few facts? If, indeed, gold is volatilized in this unaccountable manner, so contrary to previous experience, why not let us into the secret of the "peculiarities" that he hints at in regard to the concentrations? I would like to know how he knew that "the material could be roasted with little or no loss, if no salt were used, because some assays had been made in that way." This seems to me quite inconclusive; because loss could have occurred in assaying such a very remarkable substance as well as in roasting it. Then the roasting of two ½-ounce samples, one with, the other without salt, while it may afford grounds for a suspicion, is not a tithe of the evidence necessary to establish a hypothesis, far less is it sufficient base for a section in a work that could and should be made authority on metallurgical matters.

Some of that yellow fluffy sublimate, if it existed at all, would, if subjected to chemical examination, prove the existence of a hitherto unsuspected compound of gold. Let us hope some of it was saved.

It is a curious fact connected with the subject, that no one has previously discovered the demoralizing effect of salt in gold assaying. I mention this, as it is apparent that if it is so very injurious to the temperature of the reverberatory furnace, we might expect still more marked effect when it exists in equal quantities with the ore, and is enclosed with it in a crucible at a higher temperature.

Possibly, although it does not appear from the text, the author only wished his remarks to apply to that particular lot of concentrations. In that case, the article would be more appropriate to a journal of chemistry than a text-book on leaching gold and silver. At all events, that "metallurgist in reduced circumstances" should have been set to work to find out the peculiarities of the material. HERBERT LANG.

Sonsbyville, June 5th.

### Mines at Plymouth.

EDITORS PRESS:—Plymouth, Amador county, keeps on improving and is to be one of the largest mining towns in Amador county. The Empire shaft is down 1,280 ft. in depth, and the Pacific is nearly 800 ft. Charles Green commenced with 50 men Monday to dig a ditch for laying pipe to bring water from the Amador canal. It will take about two months to complete the work, then Plymouth will have clear water, with plenty of it and about 300 ft. pressure.

The Empire mine has an 80-stamp mill and the Pacific will soon commence to build a large mill. The Pacific is a new shaft south of the Empire which they commenced to sink about ten months ago, and is now 800 ft. They will put the shaft down about 1,000 ft. before they commence to run levels. The Pacific mine has been prospected from the Empire shaft at a depth of 1,200 ft., and the vein is 60 ft. wide and contains ore that will pay \$15 per ton. Mr. Harvey, from Amador, is building a new hotel, and intends to have it completed by the 4th of July.

Plymouth is to have a Fourth of July celebration, and from the names on the programme, of the gentlemen of Amador county, that have the management of it, I am satisfied they cannot fail to have a good one. PROSPECTOR.

DIFFERENCE OF TEMPERATURE BETWEEN THE POSITIVE AND NEGATIVE CARBON.—Rosetti has found that the temperature of the positive carbon of the electric arc is between 2,400° and 3,900° centigrade, and that of the negative carbon between 2,500° and 3,900°, making, therefore, the temperatures of the extreme points of the electrodes not below 2,500° and 3,900°.



# MECHANICAL PROGRESS.

## Mode of Construction and Operation of the Electric Railway.

The electric railway recently opened with much ceremony in Berlin, is constructed upon the principle devised by Dr. Siemens, of London, England. It is a narrow gauge, three-rail street railway, located on the outskirts of the city, and about two miles in length. The cars carry 14 passengers each. The electricity is generated by a dynamo-electric machine, driven by a 60-horse power engine. A miniature circular railway track, constructed upon the same principle with that at Berlin is in operation at Sydenham, England. The electric locomotive has a length of about four ft., with a breadth of three ft., and is three ft. in height, weighing three-quarters of a ton. It is, in fact, a Siemens dynamo-electric machine, neatly boxed in and mounted on a truck with four metal wheels, and provided with a brake and alarm bell for its control by the man in charge. A stationary engine of about eight horse-power nominal, in a shed about 30 yards from the railway line, drives a stationary dynamo-electric machine, from which the electric motive current is primarily obtained. Two wires are connected with this fixed dynamo machine.

By one of them the current flowing out is conveyed to the mid-rail of the railway, to which it is attached by an iron plate bolted on. The second or return wire is attached to the exterior rail of the railway. The mid-rail is supported upon wood blocks and is thus in a certain degree insulated. Beneath the electrical locomotive a brush of iron wires sweeps the mid-rail, and the electrical current is thus taken up into the locomotive, where it passes through the mounted Siemens machine within it, the large bobbin of which is thereby caused to revolve, and the current passing away by the wheels of the truck to the exterior rail of the road, is conveyed back to the stationary dynamo-machine. As the current thus circulates, and the bobbin of the mounted machine revolves, it drives the four wheels of the truck as the locomotive moves on, hauling after it a load of nearly three tons with ease. The electrical locomotive is easily managed; by applying the brake the current is cut off as a driving-power, whilst the wheels are at the same time mechanically skidded.

By reversing the current the locomotive can be driven in either direction as desired. The circulation of the electro-motive current from the stationary dynamo-machine to the mid-rail, and from the mid-rail to the locomotive, from it again to the outside rail, and from it back to the fixed machine, depends entirely upon the superior conductivity of the metallic wires and rails over the conductivity of the earth; and this mode of driving the electrical locomotive seems to make such a system open to difficulties upon railroad lines of any considerable length.

The latest accounts from the Berlin railway report many difficulties in the way of its successful operation. It was found that the electricity escaped, in great quantities from the middle rail, in spite of the best insulation which could be devised. This loss will be still greater in the wet, and mud, and snow of winter. It has accordingly been determined to conduct the current by a copper wire properly insulated and attached to pillars erected by the side of the track. The current will be conducted from the copper wire to the locomotive by means of contact rollers.

The telegraph, within a few days, has described another trouble met with at Berlin, as follows: "A horse while crossing the electric railway, having set his hoof upon the rail, was instantly thrown down, and another horse, having also touched the rail with his iron-shod hoof, received a shock which sent him galloping off in wild terror." *L'Electricite* affirms that electric railways can be successfully employed only in tunnels or on elevated roads.

**DURABILITY OF BUILDING MATERIALS UNDER HEAT.**—Dr. Hiram A. Cutting, of Vermont, has made a series of examinations into the durability under heat of different kinds of granite, sandstone, limestone, marble, conglomerate, slate, soapstone and artificial stone. Granite began to yield at a temperature of between 700° and 800°; it became cracked between 800° and 900°; generally cracked between 800° and 950°; and was made worthless by or before reaching a temperature of 1,000°. Sandstones showed a greater power of endurance, massive limestones still greater, and marble the greatest, while conglomerates seem to have been among the weakest stones. The least absorbent and the most absorbent of the granites were equally the granites most destructible by heat.

**SETTING CAR WHEELS.**—Car wheels are now kept in their place without being keyed on. In former times they were almost sure to precipitate an accident; besides, keys would drop out by the constant jar and be weakened by the axles and wheel. Axles are turned to fit the wheel snugly and are driven in place by hydraulic pressure. Previous to being driven, the axles are covered with a thin coat of white lead and oil, which hardens in a short time and holds the wheel so firmly in place that a pressure of from 100 to 140 tons is required to remove a broken axle from the wheel in which it is placed.

# Pressure, Instead of Hammering, for Shaping Iron.

The following article on the advantage of treating iron as a plastic material—employing pressure, rather than the hammer—we clip from *Lefail's Mechanical News*:

The original method of forging iron by the simple application of the hammer, continued and varied, until the desired form was given to the product, was largely improved upon by the introduction of drop-forging. By the use of a die or matrix, and the weight and gravitation of the powerful hammer falling upon the iron, it was made to assume almost instantly the shape required, under the immense force thus brought to bear; and for a great number of processes this method has been found entirely satisfactory. Not only was the rate of production vastly increased by this advance of the art, but the quality of the manufactured article, as to the condition of the fiber of the metal, where there is not too radical a change from the original form of the bar, has proved to be all that its practical use and service require.

In the exceptional cases just hinted at, however, it was perceived that a still finer adjustment of cause and effect was demanded to meet the necessities of the case. If the change of form is such that the percussion of the hammer in drop-forging destroys the fiber of the iron, the result is a failure so far as the quality of tenacity is concerned. How to meet this difficulty, and apply the necessary amount of force without the destructive effect of the sudden stroke, has been a perplexing question. To administer the blow, and yet preserve the continuity of the fiber was an evidently impossible fact. How, then, should the requisite degree of power be employed upon the iron so as to give it the form of the mold, yet without disintegrating the metal itself?

The solution of this problem has been found in treating the iron as a plastic substance, which it in fact becomes when heated to a certain degree—something less than a welding heat, and very far below a fused condition, but still imparting to it sufficient mobility to serve the purpose. In this state it is subjected to enormous pressure, steadily yet rapidly acting, and forcing it into the matrix with irresistible effect, inasmuch that when the product of this compressive forging is examined, it is found to be not only perfect in shape but unbroken in fiber, and therefore having all the toughness which it possessed in the bar. The work is done with speed, and thus far there is no dissent from the verdict of approval with which the results have been received by the iron working community. The new process is perhaps not strictly a discovery; it appears to be rather the fruit of a closer knowledge of the metal with which it deals, and a more accurate determination of the precise state in which it will submit to be treated as a fluid, while still retaining its texture as a solid substance. "Getting it down to a line point" is a phrase from the vocabulary of the street; but it gives in few words the exact nature of this latest achievement in the art of iron working, and indeed of most of the substantial victories which science is daily winning for mankind.

**EFFECT OF IMPURITIES ON COPPER.**—In a paper on copper smelting, Mr. Henry Hussey Vivian, a member of the well-known firm of Swansea smelters, states that he had been able by synthetic trials to determine the effect of impurities upon the quality of copper. He had found that 1000th part of antimony converts first-rate best selected copper into the worst conceivable, so bad as to be only fit for brass, and that one 4000th part makes it unfit for anything but inferior brass purposes and below the quality known as tough ingot. He discovered that one 8000th part reduces it from "best selected" to "tough ingot" quality, and that one 16,000th part sensibly deteriorates the copper. He stated that 1000th part of nickel, cobalt, bismuth, arsenic or phosphorus reduces "best selected" to "tough ingot," while nickel and arsenic in combination and mixed in the proportion of one 500th, make copper unfit for brass, thus showing that two substances in combination may produce a far more hurtful effect than either of them separately.

**PULVERIZED FUEL.**—The experiments of the Alexander Steamship company in burning pulverized coal, or culm, continue to be very satisfactory, and are regarded as promising entire success. They will persevere until they feel warranted in introducing the process on board their steamers. The experiments, as we are informed, are directed chiefly to two points; one relates to the construction and position of the retort or lining of the furnace; the other, to the force of the blast used in atomizing the coal. When the latter is rightly graduated, there are neither ashes nor smoke. If it is not strong enough, a part of the coal dust falls unconsumed.

**EXPERIMENTS WITH STEEL WIRE.**—Herr Strouhal and Barns report in *Wied. Ann.* certain experiments in which steel wire was treated so as to show all degrees of hardness between the glass hard and annealed states, and it was shown that the thermo-electric and galvanic properties of steel vary with the degree of hardness in a very sensitive manner. Their researches are said to throw some useful light on the nature of the annealing process and on the magnetic behavior of steel in relation to its hardness and other properties.

# SCIENTIFIC PROGRESS.

## Polarization of Sound.

Prof. S. W. Robinson has an article in the *Journal* of the Franklin Institute, the object of which is to show, by theory and experiment, that longitudinal vibrations, such as sound waves, can be polarized; and not only this, but also to show that it is irrational and improbable for vibrations in extended media generally to be primarily otherwise than longitudinal. All this is aimed especially at the "transversal theory" of light.

The phenomena of radiation, refraction, diffraction, diffusion, interference and polarization are, with the exception of the latter, common to light and sound, and it is for the sake of explaining polarization in light that physicists have set up the theory of transversal vibration. It is, therefore, only necessary to polarize the sound to place all the known effects of luminous waves in common with sound waves, or to make the theory of longitudinal vibrations universal. The author, after much study, became convinced about eight years ago that undulations generally could be polarized, and after some preliminary experimentation, apparatus was devised by him last May, by means of which he obtained results which verified all his preconceived notions in the matter. The means adopted for polarizing the undulations was the same as that for polarizing light by reflection, but the apparatus can scarcely be described without the use of figures.

The results obtained by Prof. Robinson establish the following facts for sound waves or for undulations: (1) A decided reflection occurs at a surface separating two gases of different density, confirming the views of Henry and Tyndall in this regard. (2) In repeated reflection from such surfaces, the intensity of the final component varies with the relative position of those surfaces, the same following the laws of polarization in light, from which we conclude that longitudinal undulations can be polarized.

With sound polarized, we complete the list of effects for longitudinal undulations which are known to light, viz: radiation, shadow, reflection, refraction, diffusion, diffraction, interference, and polarization; and the laws are common for like conditions.

The conclusions to which the author has been led are summed up as follows: (1) Vibrations in extended media, produced from the action of a remote single center of disturbances, can only be longitudinal, even in light. (2) Vibrations will be to a certain extent transversal when due to two or more centers of disturbance not in the same line, as when two or more independent co-existent systems of undulations combine into one, or when a simple system is modified by such lateral disturbances as a reflection or a refraction. (3) Undulations, to be in a condition called polarized, must consist of vibrations which are transversal, and no necessity exists for assuming vibrations transversal in front of a polarizer.—*Scientific American*.

**WORKING AND MOLDING IRIIDIUM.**—We have already in these columns alluded to the recent discovery by Mr. Holland, of Cincinnati, of a mode for the ready working of iridium by the addition of phosphorus, which is subsequently removed from the metal as described below. Recently, Prof. W. L. Dudley, of the same city, has alluded to the discovery in a lecture, in which he remarked:—"After the metal is brought to a high heat and phosphorus added to it, it is cast into any desired form, and the phosphorus is removed finally by heating the metal in a chalk bath. It is like steel in appearance, but is nearly as hard as the ruby. Acids cannot injure it nor can rust consume it. As the negative carbon in the electric arc, it was used for 60 hours without any loss in weight or change in form. This metal is so refractory that it cannot be hammered into shape when hot, and it resists the file. When, in the way above stated, it is molded into the form, as near as may be, of the article required, it is ground or cut to the finished state by copper disks revolving at a high velocity, on which emery and water are poured."

**A STENOGRAPHIC PIANO.**—A French inventor has exhibited in the French Chamber of Deputies, and to the Municipal Council of Paris, this latest device in stenography. The system consists of a combination of signs through which every sound is represented. The reproduction is as rapid as speaking, and the operator can continue the work for hours. The signs used in the system are printed by machinery, the reading is immediate, and it is even claimed that no knowledge of the language reported is necessary for the operator. The official stenographers propose to acquire the new method if it proves as successful as it now promises.

**IMPERMEABLE PAPER.**—By plunging a sheet of paper into an ammoniacal solution of copper for an instant, then passing it between the cylinders and drying it, it is rendered entirely impermeable to water, and may even be boiled without disintegrating. Two, three, or any number of sheets rolled together become permanently adherent, and form a material having the strength of wood. By the interposition of cloth or any kind of fiber between the layers, the strength is greatly increased.

**THE CAUSE OF THE TIMBER LINE ON HIGH MOUNTAINS.**—This subject is the matter of study by Thomas Meehan. He reports that on Gray's peak the coniferous trees near the line of 11,000 ft., are 30 to 40 ft. high, but at this line they cease as suddenly as if a wood had been cut half away by a woodman's ax. Beyond the timber line the same species exist as dwarf, stunted, trailing shrubs, often extending 1,500 ft. higher up the mountain side. He declares that these stunted plants appear never to produce seed. From his observations in the White mountains and in the mountains of North Carolina, Mr. Meehan concludes that the stunted plants are the struggling offspring of trees which, at no very remote period, extended much farther up the mountain than they now do. The disintegration of the rocks and the washing down of the earth from the higher altitudes, he regards as the prime cause of the disappearance of the large trees.

**EFFECT OF PRESSURE IN CARBONIZING WOOD.** Herr Goppert has lately exhibited a piece of pine which has been submitted for two years to a pressure of 12½ tons in a Silesian mine. It had been compressed to one-fourth, and had been converted into a half-carbonized state through the action of pressure alone, as little moisture had access, and the temperature was never above that of the surrounding atmosphere. It had quite the appearance of a dark-brown colored bituminous wood of the tertiary brown coal formation, but it was without the smell observed in burning bituminous wood. The change of volume was at the cost of the water content of the wood. A considerable amount of oxygen and hydrogen had come off as water, and the composition approximated to that of peat of the older peat formations.

**ACTINIC ZINC.**—Dr. Phipson describes a zinc-white of a dazzling purity obtained by precipitating a solution of zinc sulphate by means of barium sulphide, submitting the precipitate to strong pressure and igniting it with limited access of air. If any barium sulphide escapes oxidation, the white compound, on exposure to the sun, begins to darken, and in about 20 minutes becomes of a deep elate color. If removed into a dark place, it gradually loses color, and in about five or six hours it becomes again snow white. This experiment may be repeated with the same specimen as often as desired. Further, this change of color does not take place under a slip of common glass, whether thick or thin; at most, the compound takes a slight yellowish brown color on exposure to the sun for two hours. The sample on analysis was not found to contain silver or any other substance known as actinic.

**AN ELECTRIC TRICYCLE.**—A tricycle driven by electricity appeared lately in one of the streets of Paris. M. Trouve writes of it to *La Nature*, stating that the tricycle was of English make and very heavy (55 kilogr.), and that he had adapted it to two of his small electric motors, fed by three of the secondary elements or accumulators of electricity, which serve for his polscope. The vehicle, mounted by a friend of his, ran several times along the Rue de Valenciennes, as fast, at least, as a good, ordinary cab. The total weight of the vehicle, with its rider, was about 160 kilograms, and the effective force produced by the two motors was 7 kilogrammeters. The experiment lasted an hour and a half. In view of the results, M. Trouve has set about the construction of a motor which will produce as much as the two others, so as to obtain a greater velocity, say 20 to 30 kilometers an hour.

**DISTILLING ALCOHOL BY ICE.**—M. Raoul Pictet, of Geneva, so well known for his discoveries relating to the liquefaction of gases, announces the discovery of a method of distilling alcohol by ice. Two kilograms of ice are needed for the production of a liter of alcohol; that is, for the distillation of 110 gallons of alcohol, a little less than a ton of ice will be required. The cost of production will include only coal for working the steam engine which drives the air-pump, and the sulphuric acid, the evaporation of which produces the ice. M. Pictet declares that this will notably diminish the expense of distillation, and suggests that the excise on alcohol should be proportionally increased.

**THE UNCERTAIN CHARACTER OF OZONE.**—In a brief review of a paper on the sanitology of odors, delivered in New York a short time ago, by Dr. J. S. Linsley, the *Scientific American* wisely remarks that, in view of the uncertainties touching the occurrence and action of ozone in the air, it may be prudent to wait awhile before admitting ozone to be quite so powerful a factor of individual or national genius, health or social development as Dr. Linsley and others would have us believe.

**LENGTH OF JUPITER'S DAY.**—The Emperor of Brazil has shown the personal interest he takes in science by a note which he has recently transmitted to the French Academy upon the time of Jupiter's rotation. The sharpness of outline and the bright color of the brown spot which has been so long visible, has enabled a Brazilian astronomer, Mr. Crall, to deduce from nearly 1,100 rotations a period of 9h. 55m. 36s.

**A NEW EXPERIMENT ON MAGNETIC ATTRACTION.**—E. Piazzoli has written a paper to show that the attraction of elder pith by the magnet, as observed by Ader, depends probably on the presence of small particles of iron.



## Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending May 26.	Week Ending June 2.	Week Ending June 9.	Week Ending June 16.
Alpha.....	3.35	2.90	4.30	4.10
Alta.....	3.35	2.85	3.90	3.20
Andes.....	3.35	2.85	3.90	3.20
Albion.....	3.35	2.85	3.90	3.20
Argenta.....	3.35	2.85	3.90	3.20
Addenda.....	3.35	2.85	3.90	3.20
Belmont.....	3.35	2.85	3.90	3.20
Beat & Belcher.....	3.35	2.85	3.90	3.20
Bullion.....	3.35	2.85	3.90	3.20
Bechtel.....	3.35	2.85	3.90	3.20
Belle Isle.....	3.35	2.85	3.90	3.20
Bodie.....	3.35	2.85	3.90	3.20
Benton.....	3.35	2.85	3.90	3.20
Bulwer.....	3.35	2.85	3.90	3.20
Boston.....	3.35	2.85	3.90	3.20
Black Hawk.....	3.35	2.85	3.90	3.20
Belvidere.....	3.35	2.85	3.90	3.20
Booker.....	3.35	2.85	3.90	3.20
Caledonia.....	3.35	2.85	3.90	3.20
California.....	3.35	2.85	3.90	3.20
Challenge.....	3.35	2.85	3.90	3.20
Chollar.....	3.35	2.85	3.90	3.20
Confidence.....	3.35	2.85	3.90	3.20
Oon Imperial.....	3.35	2.85	3.90	3.20
Oon Virginia.....	3.35	2.85	3.90	3.20
Oon Point.....	3.35	2.85	3.90	3.20
Columbus.....	3.35	2.85	3.90	3.20
Champion.....	3.35	2.85	3.90	3.20
Concordia.....	3.35	2.85	3.90	3.20
Oon Pacific.....	3.35	2.85	3.90	3.20
Derbec.....	3.35	2.85	3.90	3.20
Day.....	3.35	2.85	3.90	3.20
E. M. D. Hill.....	3.35	2.85	3.90	3.20
Eureka.....	3.35	2.85	3.90	3.20
Exchequer.....	3.35	2.85	3.90	3.20
Endowment.....	3.35	2.85	3.90	3.20
Grand Prize.....	3.35	2.85	3.90	3.20
Golden Gate.....	3.35	2.85	3.90	3.20
Goodhue.....	3.35	2.85	3.90	3.20
Gould & Curry.....	3.35	2.85	3.90	3.20
Hale & Norcross.....	3.35	2.85	3.90	3.20
Head Center.....	3.35	2.85	3.90	3.20
Hessy.....	3.35	2.85	3.90	3.20
Independence.....	3.35	2.85	3.90	3.20
Julia.....	3.35	2.85	3.90	3.20
Justice.....	3.35	2.85	3.90	3.20
Jackson.....	3.35	2.85	3.90	3.20
Junker.....	3.35	2.85	3.90	3.20
Kentuck.....	3.35	2.85	3.90	3.20
Kosuth.....	3.35	2.85	3.90	3.20
Lady Bryan.....	3.35	2.85	3.90	3.20
Lady Wash.....	3.35	2.85	3.90	3.20
Lerrathian.....	3.35	2.85	3.90	3.20
Leeds.....	3.35	2.85	3.90	3.20
May Belle.....	3.35	2.85	3.90	3.20
Modoc.....	3.35	2.85	3.90	3.20
Manhattan.....	3.35	2.85	3.90	3.20
Martin White.....	3.35	2.85	3.90	3.20
McClintock.....	3.35	2.85	3.90	3.20
Mono.....	3.35	2.85	3.90	3.20
Mexican.....	3.35	2.85	3.90	3.20
Mr. Dabbs.....	3.35	2.85	3.90	3.20
Morning Star.....	3.35	2.85	3.90	3.20
Mt. Potosi.....	3.35	2.85	3.90	3.20
Noonday.....	3.35	2.85	3.90	3.20
New York.....	3.35	2.85	3.90	3.20
Northern Belle.....	3.35	2.85	3.90	3.20
North Noonday.....	3.35	2.85	3.90	3.20
Navajo.....	3.35	2.85	3.90	3.20
Ogden.....	3.35	2.85	3.90	3.20
Original Keystone.....	3.35	2.85	3.90	3.20
Overman.....	3.35	2.85	3.90	3.20
Oro.....	3.35	2.85	3.90	3.20
Paris.....	3.35	2.85	3.90	3.20
Potosi.....	3.35	2.85	3.90	3.20
Queen Bee.....	3.35	2.85	3.90	3.20
South Bulwer.....	3.35	2.85	3.90	3.20
Savage.....	3.35	2.85	3.90	3.20
Beat & Belcher.....	3.35	2.85	3.90	3.20
Sierra Nevada.....	3.35	2.85	3.90	3.20
Silver Hill.....	3.35	2.85	3.90	3.20
Silver King.....	3.35	2.85	3.90	3.20
Sucon.....	3.35	2.85	3.90	3.20
Summit.....	3.35	2.85	3.90	3.20
Scorpion.....	3.35	2.85	3.90	3.20
Solid Silver.....	3.35	2.85	3.90	3.20
South Boulder.....	3.35	2.85	3.90	3.20
South Standard.....	3.35	2.85	3.90	3.20
Syndicate.....	3.35	2.85	3.90	3.20
Tioga Con.....	3.35	2.85	3.90	3.20
Tiptop.....	3.35	2.85	3.90	3.20
Tuscarora.....	3.35	2.85	3.90	3.20
Union Con.....	3.35	2.85	3.90	3.20
Utah.....	3.35	2.85	3.90	3.20
Ward.....	3.35	2.85	3.90	3.20
Wales.....	3.35	2.85	3.90	3.20
Yellow Jacket.....	3.35	2.85	3.90	3.20

## Sales at S. F. Stock Exchange.

Thursday A.M., June 16.	800	Trojan.....	10c
50 Andes.....	2.40	Union.....	14c
130 Alta.....	3.55	Utah.....	11c
100 B & Belcher.....	2.75	Yellow Jacket.....	6c
335 Belcher.....	3.65		
1385 Bulwer.....	85c		
75 Benton.....	80c		
250 Con Virginia.....	3.40		
130 California.....	1.50		
340 Crown Point.....	3.10		
115 Confidence.....	4.95		
50 Caledonia.....	50c		
50 Challenge.....	50c		
100 Con Imperial.....	25c		
50 Exchequer.....	1c		
350 Gould & Curry.....	8c		
20 Golden Gate.....	80c		
320 Hale & Norcross.....	85c		
160 Julia.....	50c		
1100 Justice.....	75c		
100 Kentuck.....	2.40		
300 Lady Wash.....	2c		
40 Mexican.....	12c		
275 N. Ex. Utah.....	1.10		
150 New Wells Fargo.....	40c		
400 Ophir.....	1c		
100 Overman.....	1c		
650 Potosi.....	3.65		
130 Savage.....	1.30		
200 Sierra Nevada.....	1.55		
70 Silver Hill.....	1.80		
345 Scorpion.....	1.85		

## Foreign Industrial Notes.

Germany seems to be obtaining a monopoly of the iron trade. Owing to cheap raw material, low wages and the ease and low rates of water carriage, the Germans are steadily underselling the English markets.

The men employed at Krupp's manufactory are working night and day in supplying orders for large guns from abroad. Roumania has ordered 100; Greece, 700; Sweden, 50; Holland, 120, and Italy, 400. In the presence of facts like these it is a little difficult to perceive from which direction the millennium is approaching.

Several organizations have been effected by British workmen, having in view emigration to the United States, just so soon as the movement may be made with safety. As a rule these workmen are in employment and are not prepared to give up a surety without tolerably certain employment on this side that will be permanent.

## MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

### ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ. DATE.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Belle Isle M Co	Nevada	2	15	June 3	July 11	Aug 2	E M Hall
Bullion M Co	Nevada	19	60	May 19	June 22	July 13	J M Brazell
Belvidere M Co	California	11	25	May 27	June 30	July 16	C V Hubbard
Caledonia M Co	Nevada	25	30	May 3	June 7	June 28	R Wagner
Equitable T & M Co	Utah	25	15	May 10	June 17	July 11	C J Collins
Equator M Co	Nevada	4	25	June 7	July 12	Aug 1	W Wallis
Grand Prize M Co	Nevada	5	25	May 10	June 30	July 20	E M Hale
Hale & Norcross M Co	Nevada	59	50	May 10	June 15	July 5	J F Leichter
Julia Con M Co	Nevada	15	30	Apr 27	June 2	June 24	H A Charles
Kentuck M Co	Nevada	15	30	May 3	June 7	June 23	A C Stuart
Mono G M Co	California	12	50	May 19	June 24	July 14	W H Lent
Murphy M Co	California	6	15	June 10	July 11	Aug 10	S D Rogers
Oro M Co	California	1	10	May 3	June 7	July 19	W Sturges
Phonix M Co	Nevada	23	10	May 9	June 15	July 9	H Loeter
Silver Hill M Co	Nevada	15	25	May 7	June 10	June 28	W H Dean
Tioga Con M Co	California	13	15	May 11	June 17	July 7	W H Lent
Yellow Jacket S M Co	Nevada	41	100	May 9	June 14	July 6	Mercer Oley

### OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ. DATE.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Arizona Mexican M Co	Arizona	1	50	June 7	July 15	Aug 8	G R Adams
Benton Con M Co	California	5	25	May 21	June 24	July 12	W H Watson
Betty O'Neal M Co	California	50	100	June 14	July 19	Aug 9	R W Heath
Boston Con M Co	California	1	30	Apr 26	May 21	June 21	F E Luty
Derbec Blue Gravel M Co	California	8	10	May 11	June 16	July 9	T Wetzel
Elmerich Grav M Co	California	7	5	June 14	July 21	Aug 9	H Kunz
Excelsior Deep Gravel M Co	California	16	25	May 25	June 27	July 14	D B Olinholm
Excelsior Enterprise M Co	California	15	10	May 3	June 1	June 1	W H Allen
Gold Hill M Co	Nevada	2	10	April 5	May 20	June 20	D Franklades
Golden Gate Con M Co	California	4	50	May 19	June 23	July 14	J T McGeehegan
Harrington M Co	California	2	5	June 15	July 20	Aug 11	I C Miller
Iowa M Co	Nevada	13	08	Apr 23	May 30	June 18	C E Leavitt
Iron Ore Con M Co	California	1	15	May 19	June 10	July 10	A Bond
Lord of Lorn G M Co	California	1	15	Apr 19	May 31	June 28	R N Van Brunt
McMillen M Co	Arizona	3	20	Jan 12	June 12	July 27	J Morizio
North Standard G & S M Co	California	1	10	Apr 25	June 1	June 25	O Van Dyck Hubbard
Oakland G M Co	Nevada	1	10	Apr 25	June 1	June 25	W H Hopkins
Red Hill Hydraulic M Co	California	8	10	Apr 26	May 31	June 20	H P Bush
Silver City M Co	Nevada	2	10	May 2	June 6	June 27	A K Durbrow
Swamp Angel G M Co	California	4	125	June 14	July 16	Aug 4	L Little
Three Brothers M Co	California	15	10	May 25	June 23	July 10	C Meade
Union Gravel M Co	California	17	50	May 7	June 15	Aug 25	H Pichior
Wolverine Gravel M Co	California	2	10	May 31	July 1	Aug 1	E J Blanding
Wide Awake M Co	Arizona	13	10	June 4	July 15	Aug 10	C Hildebrandt

### MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alpha Con M Co	Nevada	W Willis	309 Montgomery st	Annual	June 20
Associate Stock Brokers	S F	J W McClung	Stock Ex	Annual	July 11
Belle Isle M Co	Nevada	E M Hall	327 Pine st	Annual	June 22
Bullion M Co	Nevada	W H Knight	337 Pine st	Annual	June 25
Belvidere M Co	Nevada	H Lowden	330 Pine st	Special	July 25
Mt Potosi M Co	Nevada	H Rose, Jr.	302 Montgomery st	Annual	June 21
Mammoth M Co	Nevada	H H Waskell	528 California st	Annual	June 24
Mint M Co	Nevada	E M Hall	327 Pine st	Annual	June 22
Northern Belle M Co	Nevada	E M Hall	327 Pine st	Annual	June 22

### LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W V Taylor	37 Nevada Block	50	June 20
Father De Smet M Co	Dakota	H Dean	New York	50	May 10
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	50	May 16
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	25	May 16
Silver King M Co	Arizona	J Nash	315 California st	25	June 15
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	June 13
Western M Co	California	O S Curtis	309 Montgomery st	75	May 12
Navajo M Co	Nevada	E M Hall	327 Pine st	25	Mar 25

### The Mechanics' Fair.

At the meeting of the Trustees of the Mechanics' Institute, held on Tuesday evening last, they awarded privileges for the next Mechanics' Fair, as follows: Printing, Dewey & Co.; eoda, G. C. Thompson; candy, D. S. Ciphers; cider, G. C. Thompson; ice cream and restaurant, Vienna Bakery; pop corn, D. S. Ciphers. An effort is being made by the Trustees to get for exhibition the smaller of the two telescopes now being built for the Lick Observatory at Mount Hamilton—the instrument having nearly completed. As several inventors have been endeavoring to perfect a flying-machine, the Board of Managers have decided to offer \$1,000 for the first successful attempt made with such a machine at the Mechanics' Pavilion at the next fair. The fair will open on the 2d of August. About three-quarters of the space included in the building has been already assigned to intending exhibitors. This year the managers will give exhibitors the space needed for a proper display of their exhibits free of rent. The managers represent that the prospects of the coming exhibition are unusually brilliant.

It will be noticed that the publishers of this journal have been awarded the privilege of publishing the *Fair Daily*. This privilege we have had for a number of years consecutively, which is the best guarantee that it has been done to the satisfaction of the management and the patrons of the fairs.

A NEW ORE PULVERIZER.—Mr. I. W. Tustin, of this city, has invented an ore pulverizer which is claimed to be a great improvement on anything in that line hitherto introduced. The simplicity of its construction as well as the small amount of power required to work it, are the most essential points to recommend it to general use. A model of this pulverizer capable of working about 6 tons in 24 hours is at present in operation at the ore sampling works of Messrs. Hofmann Bros., 415 Mission street, where it has been worked to their entire satisfaction, and where it may be seen and inspected by all who are interested in mining and milling machinery. Mr. Tustin at all times will cheerfully exhibit and explain the merits and advantages of his invention.

FRUE CONCENTRATORS.—The Providence M. Co., Nevada county, which is now putting up a 40-stamp mill, has decided, after thorough investigation, to adopt the Frue concentrators, and has purchased 16 of these machines. All the other concentrators in the market were examined, and they decided on adopting it, because of its greater efficiency. The superintendent of the Murchie company, reports that the annual repairs on the concentrators are only \$10 a piece.

### The Mining Share Market.

There is not much to say about mining stocks. Our tables give full information about fluctuations. The number of pending mining assessments is now smaller than it has ever been in the history of the mining share market. There are now but 28 mines with assessments pending on their stock. Of these only 10 are Comstock. At the old bonanza mines they now have an excellent circulation of air everywhere from the 2000 down to the 2500 level, and are beginning the work of exploring the ground lying between those points. The drift north in the California, 30 ft. below the 2000 level, is still following a seam of quartz. The *Enterprise* says: Again there is delay at the Combination shaft, but this time it will be short. It must be that they will soon find all those weak points disclosed by actual work but hidden to mathematics. In the starting up of the Virginia City and Gold Hill water-works there was the same trouble in Washoe valley at and near the bottom of the inverted siphon formed by the high iron conducting pipe, but when practical working had corrected the faults of figures all went well, and has been going well and smoothly ever since. So it will eventually prove with the hydraulic pump. The principle is all right, but faults are found in the calculations as regards the strength of material employed in the construction of the apparatus. Actual work finds the point where the greatest strain comes, and corrects the errors made in calculating the strength of the metals employed.

### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Northern Belle, June 8th, \$6,481; Mount Diablo, 7th, \$8,049.53; Christy, month of May, \$28,612; Northern Belle, 8th, \$23,325; Christy, 10th, \$6,799; Germania, 9th, \$1,800; Hanauer, 9th, \$2,500; Christy, 9th, \$7,185; Horn Silver, 10th, \$12,500; Bullionville, 10th, \$2,345;



dency of Wm. Fawc. The ledge is from 18 inches to 2 ft in thickness, which assays from \$40 to \$60 per ton. The shaft is now down about 35 ft. The mine is well spoken of by practical miners of that locality.

FRESNO.

**CHART.**—Fresno *Expositor*, June 11: Considerable excitement has been occasioned by the discovery of rich gravel deposits along the banks of Keyser gulch. The bed of the creek was very rich, and was mined years ago with good results, but the banks above were never prospected to any extent. The deposits now being opened are of a bluish cast, and no doubt indicate the channel of an ancient river. It appears very rich, and should the discoveries prove as extensive as is now supposed, will also indicate a point a short distance east of Canada hill. The croppings show one ledge 8 ft thick with 3 more ledges measuring respectively 6, 4 and 3 ft making into it. There is also a vein about a foot thick that crosses this series. The prospecting is being conducted by means of a tunnel that has just struck the edge of the 3-foot ledge, and will have to run 300 ft to reach the point where they all come together. Here 300 ft of backs will be obtained. A crosscut, is to be run to tap the 4-foot ledge also between the mouth of the tunnel and the big deposit.

INYO.

**BYRIDER AGAIN HEARD FROM.**—Inyo *Independent*, June 11: A clean-up of the anaristas after a three week run, ending June 4th, has produced \$13,000 in gold bullion; \$5,000 of this amount has been shipped from Wells, Fargo & Co.'s office in this place, and \$1,000 from the Lone Pine office, while \$1,000 remains in the hands of the producers, yet to be disposed of. The Taylor mill starts up on Monday, the first of next week, and for at least a month to come the numerous anaristas will continue to run as heretofore.

NEVADA.

**THE ALTA MINE.**—Nevada *Transcript*, June 14: R. B. Symington and J. C. Luckin are developing a promising quartz claim at a point a short distance east of Canada hill. The croppings show one ledge 8 ft thick with 3 more ledges measuring respectively 6, 4 and 3 ft making into it. There is also a vein about a foot thick that crosses this series. The prospecting is being conducted by means of a tunnel that has just struck the edge of the 3-foot ledge, and will have to run 300 ft to reach the point where they all come together. Here 300 ft of backs will be obtained. A crosscut, is to be run to tap the 4-foot ledge also between the mouth of the tunnel and the big deposit.

**CONTRACT LET.**—Grass Valley *Union*, June 19: The Maryland M. Co. has let to Wm. Carlson (he being the lowest bidder) a contract to raise a shaft from the drain tunnel to the surface, a distance of between 100 and 150 ft. The dimensions of the shaft will be 9x4 ft, double compartment. The shaft will be about 800 ft. The contract is expected that the work on the contract, which is to be started immediately, will be completed in 2 months. It is the intention of the company, upon the completion of this contract, to let another for sinking the shaft below the tunnel level to a depth not yet determined upon. The Maryland is yet to be one of the great mining properties of the district.

PLUMAS.

**DISCOVERY.**—Greenville *Bulletin*, June 10: A rich ledge has been discovered near the Cherokee mill on the ridge above the road, not far from the Round Valley reservoir. **SOUTHERN EUREKA.**—From President J. B. Scott's letter every day shows improvement in this mine and in the quality of the ore. The result of the last clean-up was considerably in advance of any previous one, and is calculated to make glad the hearts of officers and stockholders. A. B. Williams, of Reno, succeeds M. B. Bradford as Supt.

**SAYREWOOD.**—This mine is about 10 miles from Greenville, on the north fork of Feather, 5 miles below Bidwell's bridge. It has a small mill of 40 stamps, 20 of which are now doing a very good quality of ore. Supt. Hart received us cordially, and very kindly showed the mill and 4 of the tunnels. There are 9 of the latter, all of which strike the ledge. Col. Lansing, of New York, and C. W. Reed, of Sacramento, two of the principal owners, are to arrive this week, after which it is expected that a number of concentrators will be put in for the purpose of saving sulphurates, of which the ore carries a large percentage. Jesse Carney, formerly of the Plumas Eureka, is the amalgamator, and Mr. Colwell, book-keeper.

**GOOD CLEAN-UP.**—National, June 12: Loring & Leavitt brought into town on Wednesday a very handsome lot of gold. The clean-up for last week amounted to over \$1,700; and for the first two days of this week, \$344. The yield from this mine is steadily increasing.

**NORTH FORK NEWS.**—Lant Hallist, d. who has been over on the North Fork, informs us that the miners in that section are doing a very good quality of ore. Supt. Hart received us cordially, and very kindly showed the mill and 4 of the tunnels. There are 9 of the latter, all of which strike the ledge. Col. Lansing, of New York, and C. W. Reed, of Sacramento, two of the principal owners, are to arrive this week, after which it is expected that a number of concentrators will be put in for the purpose of saving sulphurates, of which the ore carries a large percentage. Jesse Carney, formerly of the Plumas Eureka, is the amalgamator, and Mr. Colwell, book-keeper.

**OFFER REFUSED.**—Some days ago an offer of \$50,000 was made to Loring & Leavitt for their claim at Elizabethtown. As the payment was partly conditional on the product of the mine, the offer was refused; but the owners agreed to take the sum in a yearly annuity of \$1,000, and the offer was accepted. The offer was made by a party who wished to purchase, having thought the matter over, concluded to pay that sum. Mr. Manson, of Greenville, who represents these people, came over from Greenville Wednesday ready to pay the deposits and make the trade on those terms, but the owners now decline to sell. The yield of gold is increasing all the while.

SAN BENITO.

**OUTLOOK.**—Pacific *Coast*, June 10: Important discoveries have recently been made in the Pico mine near Erie, and the outlook is quite promising for the future. Much of the quartz now taken out is quite porous, and is very easily drilled and worked. The quality and the quantity of the quartz is steadily improving, and the outlook is now greatly strengthened in the belief that they have a good property. A larger force will soon be at work. At the San Benito mine some new apparatus has recently been tested which gives decided satisfaction. There is abundance of paying rock in sight. From other mines in different parts of the county we also have quite encouraging reports.

SIERRA.

**RIEN.**—Greenville *Bulletin*, June 10: Mr. E. M. Prime, just in from Sierra county, gave us a call yesterday, and reports that from the Rainbow quartz claim there was taken out 20 ounces of gold in one day; that the owners had already taken out \$70,000, and had been offered and had refused \$1,000,000 for their claim.

**QUIT WORK.**—Mountain *Messenger*, June 11: Nearly all the workmen in the Bald Mountain mine, Forest City, quit work on Monday on account of a reduction of the price of labor. The price of drifters was reduced from 60 to 50 cents per carload. Main tunnel from \$4.50 to \$4.00 per foot; gangways from \$3.50 to \$2.00; air course from \$2.00 to \$1.50. On this striking work has not been reported, the men asserting that they cannot make wages at these reduced prices.

**HASKELL PEAK.**—Haskell Peak Co. has their main tunnel in 1123 ft. A contract has just been let for sinking to the bedrock. The shaft is down about 15 ft, in fine red quartz gravel, that evidences good pay ahead. The most singular feature connected with this tunnel is that the air is just as good at the face of the drift as at the bottom, without the aid of any air pipes or shaft. An assessment of one cent has just been collected, which, after all the debts have been paid, leaves a handsome surplus in the treasury for future operations.

**GRAVEL.**—We are assured that the Savage Co. have struck a gravel prospect. From what we have never doubted but that the company would. From what we can learn we should judge that a gravel was struck.

**ARRIVAL.**—The Arizona tunnel is in nearly to the shaft. A company formed by the late Alfred Smith, has arrived in Sierra City, and says he will commence work immediately. The company has a large tract of mining land located.

The Bonanza mine, Howland Flat, is paying hand-somely, and the channel widens as they go on. The Arizona tunnel is in nearly to the shaft. They had a slight cave in this tunnel last week, which has delayed them somewhat.

**MORRISTOWN.**—J. M. Elko was down this week. He said that near the whole of Craig's Flat is now away, and would be hardly recognizable by an old settler. There are still 500 inches of water available for milling purposes. Supt. Swan is busily engaged, with a large crew, developing the extensive hydraulic diggings recently purchased by Eastern capitalists. Prof. Blake, lately up here on a flying visit a few days, owns one-quarter of this property, and through his influence the sale of it was effected. The projected new road, from Morrystown to Fort Wile will probably be made some time this year.

TRINITY.

**TAYLOR FLAT.**—Trinity *Journal*, June 11: Of all the mining industries on Trinity river none give so much promise as the Trinity hydraulic gold mine at Taylor flat. The company is now out of debt and has reached some rich ground which is paying well, as we learn from reliable authority. It is expected that this property will next season take rank with the best.

TUOLUMNE.

**CONFIDENCE.**—Tuolumne *Independent*, June 10: There are at present quite a number of men employed in the mine, which is turning out some very fine rock. The mill is kept running day and night, with bright prospects, from the amount of quartz in sight, of keeping her 20 stamps busy for a long time to come.

NEVADA.

WASHOE DISTRICT.

**SIERRA NEVADA.**—Virginia *Enterprise*, June 12: On the 2500 level east crosscut No. 1 has been advanced 36 ft; No. 2 has been advanced 17 ft, and No. 3 is in a total distance of 34 ft. During the week 307 tons and 1,000 lbs. of ore, assaying \$36 per ton, have been raised.

**HALE & NORCROSS.**—Owing to the intense heat the work throughout the mine has been very much retarded. Completed repairs to the pump-rod and started the pumps yesterday.

**CON. VIRGINIA.**—On the 2300 level we are enlarging the connection between the Best and Belcher winzes and upraise between the 2000 and 2300 levels.

**UNION CON.**—The joint Sierra Nevada winzes (2500 level) has been sunk and timbered 13 ft; also cutting out tank shaft at 2000 level.

**OPHIR.**—On the 2500 level the joint California winzes has been sunk and timbered 12 ft. The joint Mexican east winze has been sunk and timbered 15 ft.

**MEXICAN.**—On the 2700 level the joint Ophir east crosscut has been extended 26 ft.

**UTAH.**—Since last report the incline has been sunk and timbered 15 ft. This ground in the bottom is working better.

**UTAH.**—During the past week we have sunk and timbered the shaft 27 ft. Total depth, 2,640 ft. The rock is harder.

**CALIFORNIA.**—On the 2500 level the joint Con. Virginia east crosscut has been advanced 32 ft, and the joint Ophir east winze has been sunk and timbered 12 ft.

**UNION SHAFT.**—Are cutting out a station at the 2700 level and easing at the 1000, 2000, 2400 and 2500 stations. **YELLOW JACK.**—We reached the 2800 pump on the 7th inst.; repaired the same and resumed pumping. We are now preparing to lower the water to the 2525 station, where we have a drift connecting with the Belcher 2700 level. On our 2700 level during the week we have repaired and raised the grade of the track, and placed pipe to conduct water to the 2800 tank.

**NEW WELLS-FARGO.**—The lowering of the water in the shaft has been more rapid than was anticipated, on account of the water receding from the 300 ft level. This difficulty is being steadily overcome.

**SUTRO TUNNEL.**—Drain boxes covered, last report, 17,000 ft; drain boxes covered since last report, 684 ft. The covering of the drain boxes has been finished. Single line of large boxes put in, last report, 1,006 ft. This large boxes are now finished up to a point 18,721 ft from the tunnel entrance. The work of the week the usual repairs have been made along the main line. Flow of water from tunnel entrance equal to 4,752,000 gallons per 24 hours. An excavation for a carriage switch, 55 ft long, has been finished. Between the end points of this curve, for a distance the drift was run 10 ft wide for the carriage station.

CAÑADILLA DISTRICT.

**NORTHERN BELLE.**—True *Pisgah*, June 11: At a point 45 ft above the 2nd, near the center of the mine, a body of good average ore has been opened. The 12th level shows finely, turning out considerable ore of good quality. The levels above the adit are producing as usual. Both mills are running steadily. Bullion shipments on June account to the 13th inst. \$2,325. The face of the north crosscut from the bottom of the winze, from the third level, is in a ledge of low grade ore and shows considerable improvement; total length, 27 ft. The west drift from the north crosscut, on the same level, shows some improvement and looks well. The slope on the first level shows a body of free ore about 35 ft long, and averaging 6 ft wide, assaying over \$100 per ton. On June 7th the mill, assaying to \$8,049.55 was shipped, and on June 10th, \$6,799.86.

CHEERY CREEK DISTRICT.

**ANOTHER STRIKE IN THE STAR.**—White *Pine News*, June 11: We learn—though from no official source—that another very important discovery has been made during the past week in the lower workings of the Star mine. It is every day becoming more transparent that the Star is destined to prove one of the most permanent as well as valuable mining properties in eastern Nevada.

**BULLION.**—The Star Co. shipped through Wells, Fargo & Co., for the week ending June 4th, bullion the gross value of which was \$3,656.08. The Exchange shipped one bar on the 7th valued at \$1,300.

ESMERALDA DISTRICT.

**THE HUMSBOLDT WEST.**—Esmeralda *Herald*, June 10: The crosscut on the 100 level shows the east ledge to be 23 ft wide, with not a stratum of waste rock. The lowest assay gives about 100 per ton, and the highest goes far up in the hundreds. It is estimated that the average of the entire ledge will not fall short of \$30—some say more.

**THE CORTAZ.**—The incline is now down several feet below the 100 level from the tunnel, making the depth now reached over 200 ft from the croppings. The width of the ledge is the same, and the quality of ore fully as good. This would seem to knock into a cocked hat the silly theory of those not posted on our camp, who have always concluded that our ledges do not go down to any depth before they "pete" out. The fact is, there has never been an instance in the history of this mining district where a ledge has given out. The Cortez owner had worked down until a barren spot in the ledge was encountered, and there stopped. The present company started work where the former owner left off, and in less than 6 ft again came into rich rock, which they have continued for over 70 ft, and yet there is no sign of "pete"ing.

**THE CENTRAL.**—Messrs. Ball & Groh are keeping right on extracting ore of the richest kind from this mine. **THE UTAH.**—Men are now at work cleaning out the old whim shaft and putting in a double set of ladders, preparatory to prosecute work in the mine.

GOOD HOPE DISTRICT.

**GOOD.**—Tuscarora *Times-Review*, June 10: From Good Hope district we have good news. The mill is working well, and if the boys only take out ore to keep it running the future of the district is good.

LAKE DISTRICT.

**CONTRACT LET.**—Ward *Reflex*, June 11: S. A. Winall, Supt. of the Scorpion mine, in Lake district, has let a contract to extend the tunnel 60 ft. Ore of good quality was struck the first shot.

TAYLOR DISTRICT.

**SHIPPING ORE.**—Ward *Reflex*, June 11: The owners of the Monitor mine in Taylor district have commenced shipping ore to Eureka for reduction, which they will continue to do until the mill on Sterpe creek is completed. **HALE.**—Messrs. Briggs, Lyons and McGill, the owners of the Monitor mine in Taylor district, have purchased the

old leaching mill from the Martin White Co., and will immediately move it to the mill site recently purchased by them on Sterpe creek. The mill will be run by water power. Although called a leaching mill it is no part of the purpose of the owners to work by the leaching process. Over 400 tons of good milling ore are on the dumps of the Monitor, and the mine is in such shape that 4 or 5 men can keep that amount ahead of the mill. It now looks like Taylor district will be heard from this summer.

TUSCARORA DISTRICT.

**THE MINES.**—Tuscarora *Times-Review*, June 10: Since the order has been issued by the directors of the Grand Prize to shut down the 600 level, much attention has been attracted to this district. There is not now, nor has there at any time been anything, to discourage live and practical miners from following up or down the work on Tuscarora mines, with the same energy that characterized the labors of Sharon and others in Virginia City. We assert on the honor of journalists, that there is nothing beyond the uncertainty of all mining ventures to militate against the financial outcome of Tuscarora. We have already coined more dollars than have been sent to us. We have drawn very lightly upon the purses of foreign stockholders; we have paid for all our claims; we have not our laborers, who have never reduced as a matter of financial necessity the wages of miners, and have scattered hundreds of thousands throughout the Pacific coast. We have had but few failures in town, and but few "wild-cat mines" have ever been thrown upon the innocent and unsuspecting public. Then we ask, in view of the premises, why is this district, and why this effort to depreciate the real value of Tuscarora? The answer is not obvious, and we must unhesitatingly predict a larger bullion shipment and more active mining operations during the present season than has ever been witnessed before.

WARD DISTRICT.

**REPORTED STRIKE.**—White *Pine News*, June 11: A report reached here Thursday that an important strike has been made in the Paymaster mine at Ward, and that as a consequence the people over there were highly elated, which, if the report proves true, they have good reason to be. We sincerely hope the reported strike may prove a valuable one.

WHITE PINE DISTRICT.

**MINING SALE.**—White *Pine News*, June 11: Rumor was current on our streets yesterday that the Jennie A mine, at White Pine mountain, had been sold to London capitalists for \$250,000. The Jennie A is a base metal mine, and has for years been considered a valuable property.

ARIZONA.

**OLD DOMINION.**—Globe *Chronicle*, June 9: The developments on the properties of this company are indeed of the most satisfactory kind, and nearly every day reveals some new development, proving that the ore in these mines are continuous veins that will last for years. On Tuesday last, in the tunnel on the Old Dominion, they struck the ledge about 60 ft west of the shaft, and have penetrated it to the distance of 3 ft, finding very rich red oxide and green carbonate ore. On the New York and Chicago there seems to be no lack of rich ore; the tunnel at a distance of 60 ft from the mouth a crosscut was run to without striking the south wall. The shaft is down 50 ft with ore on all sides. Two 30-ton smelters are now being built in San Francisco, by Messrs. Prescott, Scott & Co., and will be erected and running as soon as possible.

**THE TARKOMA COPPER MINE.**—This mine has some rich copper glance ore, which also assays high in silver. From a drift in the upper shaft, rich oxides of copper are being taken out, along with considerable glance ore, which is said to be malleable in spots, under the knife point. The cut along up the hillside exposes a 3 ft vein of extremely rich copper ore for 200 ft, a large portion of it being a solid mass of pure copper glance. At the 100 ft level in the lower shaft a crosscut was made, tapping the v-e in and striking rich ore.

**MACK MORRIS.**—The men are still stopping in the third level and taking out the rich ore that was reported last week. Everything at the mine and mill goes on like clock work.

**SILVER NEEVER.**—The south drift on the 180 level to connect with the main shaft, is being rapidly pushed ahead. There is some nice looking ore in the face; the east crosscut on this level is also being driven ahead rapidly and in a more favorable formation.

**MULE MOUNTAINS.**—Arizona *Miner*, June 10: Francis Donnelly, who came in from Tombstone Tuesday, reports mining matters lively in the Mule mountains. He is part owner in the New Year, Southern Cross and other claims there, on the first of which Col. Oerald is putting down a shaft 150 ft deep. He is now down 78 ft, and has exposed a fine body of carbonate ore, which assays an average of \$200 per ton. These claims are very promising, and will undoubtedly add to the good reputation of the Mule mountains district.

**MULE MOUNTAINS.**—Arizona *Miner*, June 10: Mr. M. S. Snyder, who got back from the Meyers district this morning, reports matters very quiet in that neighborhood, notwithstanding the excellent outlook for eventual prosperity. The famous Gunsight mine is awaiting the smelter to be soon erected, and only a very few men are now at work on it and the Western, an adjoining mine. The Yahoo mine, which came in from Tombstone Tuesday, reports working it, and it is idle. Quite a number of prospectors who own claims in that vicinity are steadily at work developing their claims. Wood and water are scarce, and much trouble is experienced by the miners on account of their absence. The future of the district, however, is very encouraging.

**QUARTZ MILLS SOLD.**—Arizona *Journal*, June 13: Sheriff Paul reported yesterday from a party who on Saturday sold under execution the Deere & Townsend quartz mill. The property was bought in by Pedro Aguirre, one of the heaviest creditors, for \$9,000. This mill has a battery of 10 stamps, and is said to be capable of doing as good work as any machinery of the kind in the Territory. Under these circumstances the price at which the property was disposed of was remarkably low.

**CORNER.**—Silver *Reflex*, June 11: The Belcher copper claim was sold Sunday. We found a shaft 20 ft deep, cutting a strong ledge of ore which carries a large percentage of copper. The ledge, where it was prospected by means of a crosscut, is 6 ft wide. The ledge is traceable on the surface for a long distance.

**RIEN.**—In the East Richmond mine, on the 100 level, they are taking out some of the richest ore yet found in Arizona. They take out 100 tons of ore, which is worth, weighing from 75 to 100 lbs. They are shipping ore.

**BULLION.**—By the end of June the total bullion shipments of the Mack Morris will have reached the respectable total of half a million of dollars. This represents less than a year of actual work. It is safe to predict that in another year the above figures will bear no comparison at all with the yield.

COLORADO.

**CLEAR CREEK.**—Chaffo *Co. Times*, June 8: The prospects in Clear creek gulch, from a point about 6 miles west of its junction with the Arkansas river, to the Continental divide, 12 miles farther west, all give promise with development of becoming more or less valuable. Some very rich paying mines will no doubt be opened, from present indications, this season. At the head of the main branch of Clear creek a number of excellent claims have been located, but the unusual fall of snow last winter has made them inaccessible until very recently. It is the intention of the two branches of Clear creek, on a towering wedge-shaped mountain which has been named Middle mountain, are a large number of excellent locations, which with systematic work will develop into good mines. Just below the forks, in a pretty little park, a town has been laid out called Florence, which already contains 10 or 12 houses, and a large store is now being finished. Here the Clear creek is generally called. It is located about 2 miles below Florence, and is surrounded by some really good claims and many fine prospects.

IDAHO.

**COMMENCING.**—Yankee Fork *Herald*, June 4: Oen. E. E. Cunningham, Supt. of the Yankee Fork Con. Gravel M. Co., arrived here from New York Wednesday to commence active operations. He says piling will commence Monday in the face of the bank, which is 60 ft high, and the gravel prospecting from the surface down. Arrangements are also being made to extend the ditch down to the bars, 2 miles below, where one or two little plants will be put to work this summer. Their ditch carries 2,250 inches of water.

**SALMON RIVER.**—Yesterday the furnace was started up. After running 24 hours 30 bars of good, clean bullion were molten, the bars weighing from 100 to 150 lbs each. The average return since has been 8 bars per hour. Nevada and Utah men say that, for the size of the smelter, this cannot be excelled. All of our citizens are jubilant over so fair a showing.

**THE OVERLAND MINE.**—owned by J. D. Woods, has a force of men at work. They are down 55 ft, and have 5 ft of good ore. The ore will go \$100 per ton.

**THE FAITHFUL BOY.**—is running a force. A large amount of ore is out, which will be taken out and worked at the furnace as soon as teams can commence work.

**WOOD RIVER.**—Wood River *News*, June 8: It is often remarked that Wood River is a strange camp, not like others. And it is so. Those who are prepared to stay, if the country "suits them," look around while satisfying themselves, one way or another—and so far, it has been favorable to the new camp—and then they proceed to pre-dwelling places; not brush tents, but good substantial houses. The prospects, one and all say, justify a solid, permanent move in the start, and they do not believe in the mushroom order of business where a country offers so many and such varied inducements to the permanent settler.

MONTANA.

**ALICE.**—Inter-Mountain, June 8: The winze which is being sunk from the 500 level on the north vein has attained a depth of 175 ft, and is expected to connect with the 700 level in about 2 weeks, when, ventilation being provided, a largely increased force of men will be employed in stoping the ore bodies recently opened up. The upper levels are yielding ore in regular quantities, which pulp from \$50 to \$80, and as yet there is no indication of the supply becoming exhausted.

**MAONA CHARTA.**—Preparations are now being made for the development of this mine on a scale commensurate with its size and value. In the shaft-house a gallow's frame of the same size and pattern as that of the Alice will soon be erected and a pair of boilers and an engine of sufficient capacity to sink 1,000 ft have been recently ordered.

**BELL.**—For the past 5 or 6 weeks operations in the Bell have been confined to the sinking of the east shaft and of the winze from the 200 level. The shaft having reached a depth of 300 ft a north crosscut was extended to the ledge, penetrating the footwall at a distance of 6 ft. The face of this crosscut has since been advanced 13 ft from the shaft and is still in ore, the hanging wall not having been encountered. The ore so far opened up is of three grades, the first-class ore predominating.

**CORA.**—The Cora shaft, in which a fine body of ore was recently discovered, and which was erroneously reported to be an incline, is being vigorously pushed downward, having now reached a depth of 170 ft. The ledge in the bottom is 6 ft wide and samples 75 ounces in silver. It carries also a small percentage of copper, but not enough to prevent its being successfully milled after roasting. The product of the shaft alone is now 5 tons daily, and drifts on the vein will not be extended until a depth of 200 ft has been attained. The ore is being shipped to the Silver Bow mill.

**ANSELMO.**—Sinking on the two shafts is being rapidly prosecuted, the west shaft being 320 ft and the east shaft 270 ft in depth. From the 300-ft station in the former the east drift has been extended 50 ft, the ledge being about a foot wider than in the level above, and the ore showing an improved quality.

**MOULTON.**—The Moulton keeps on the even tenor of its way without let or hindrance. The depth of the shaft this morning was 372 ft, the granite in the bottom being of the proper texture for good blasting.

NEW MEXICO.

**CHLORIDE DISTRICT.**—Cor. Tombstone *Union*, June 10: Much has been said within the last few months in regard to the Black range, and in regard to the magnificent finds which it offered to the prospector, especially of Chloride district, which has been pronounced another Tombstone. In view of these facts it may not be without interest at this time to state the result of 2 months' prospecting in the Chloride district. Chloride is situated in the Black range, a spur of the great continental backbone, between the Rio Grande and Mt. Rio Minimes, extending north and south. The district is about 12 miles in length, with one large ledge of flinty, white quartz, broken up here and there into smaller ledges, which can be plainly traced the entire distance. The formation is porphyritic and sedimentary, with an almost complete absence of granite, quartzite and lime. The ore is found in spots and pockets in base, with some horn silver. There are no deep shafts so far, the deepest, the Wall Street, being only 40 ft, and further developments do not tend to improve the camp. On a fair and dispassionate view of that new field of mining enterprise, I am emphatically of the opinion that a second Tombstone has not arisen, and that this district is in little danger of losing its laurels in competition with the Black range.

OREGON.

**RIE VALLEY.**—Bedrock *Democrat*, June 8: Hobbs & Co., have sold their placer claims to Chinnamen. Lum Davis has also sold to Chinnamen, so Lum and Mrs. Lum are flush with coin, and happy. C. M. Foster has been here surveying the Company's ground and tunnels. S. Ottenheimer has been looking after his mining interests on Snake river. The Company's mill is running constantly, its large reserves of quartz in the mine. The indications for continued success are more promising than at any time during its past history.

**ITEMS.**—Democratic *Times*, June 10: Mining items are scarcer than gold dust. Piping is still going on at the Grand Applegate mines. Several of the miners on Foot's creek are still cleaning up. Bills & Armstrong, mining on Bankum, cleaned up \$200 the other day the result of a 14-day run with four hands. Frank Ennis returned from Galice creek last week, from whom we learn that that camp is in statu quo, the miners having gone into summer quarters. J. S. Howard has surveyed the line of the extension of the Sterling M. Co.'s ditch and work will be commenced soon. This makes the ditch about three miles longer, which will then cover the company's vast mining property entire.

UTAH.

**CHRISTO.**—Silver *Reflex* *Miner*, June 8: The Christo Co. is constantly attempting to outdo its previous efforts, and now comes forward and reports the most productive month's run of the mill, with two exceptions we believe—since they started their machinery some 3½ years ago. This is the more gratifying in view of recent events, which could but shake the confidence of those not familiar with the extent and richness of our mines. The company shipped 15 bars of bullion for the month of May, amounting to \$28,612.20.

**STROMONT.**—Repairs at the mill were completed during the week, and it is expected to start its stamps as soon as the ore supply will justify.

**BARBER & WALKER.**—Negotiations are pending with the creditors of the Barber & Walker, which are expected to terminate favorably, when the works will start up. There is sufficient ore in sight in the different workings of the mine to fully justify every reasonable expectation.

**THE STAGE MET A TRAIN OF 36 MULES** the other day which had just left Custer, Idaho, each mule carrying two bars of bullion, the whole aggregating \$177,000.



### Special Exhibitions—Their Great Value and Importance.

Nothing more fully impresses the careful observer of events, in regard to the stronghold which the value of exhibitions of skill and industry has taken upon the public mind, than the innumerable "special exhibits," which from time to time are being held or announced, both in this country and Europe. The demand for this kind of study and advertisement has become so great that exhibitions have now to be classified, in order to find room and space for them. Instead of a general exhibition of all the industries of a country at one time and place, these industries are divided up into class exhibits. For instance, we have just had an exhibit of the milling industry of this country, at Cincinnati, and we are soon to have one of the cotton industry, at Atlanta, while another exhibit of food industries is promised, and so on through the entire catalogue. A great advantage gained from these class exhibitions comes from the fact that a full exhibit of any special class becomes necessarily national or international in character, and brings together at a given point the entire experience of the country, and all persons who are largely interested in that specialty. The general beneficial results are thus greatly increased.

#### The Flour Miller's Exhibition,

Which was held at Cincinnati about a year ago, and which was one of the first efforts of the kind in this country proved a most decided success and aroused a wide interest in milling industry all through the country. Although it did not pay expenses, it was considered of so much value to parties most directly interested that the \$12,000 or \$15,000, required to make up the deficiency, was readily raised.

This great gathering of experts and scientists and the opportunity offered for comparison of methods and means, cannot fail of being greatly beneficial in advancing the interests of this important and growing industry.

#### A Brewer's Exhibition

Was held in London over a year ago. Besides an exhibition, this was also a trade mart, and the transaction of business reached fully a million and a quarter of dollars in a single week. Some 300 exhibitors showed over 2,000 different kinds of exhibits. The United States entered the lists in competition, and with most unexpected results. The exhibits of beer offered by Americans were received with much satisfaction, and since that time it is reported that American beer has become very popular in London, so much so that the *Pall Mall Gazette* characterizes it as a "bright and pleasant article," and warns English brewers of the dangers that may be expected from American competition in this line.

Agricultural Hall, in London, a few months since, was the scene of still another exhibition of quite a novel character, in which our own country took quite a prominent part. It was a display of the multitudinous

#### Food Products of Europe, America, and Australia.

The exhibition was designed mainly with a view of bringing under notice of the English public the many varieties of preserved fish, vegetables and fruit, together with the best methods of preparing them for the table. In addition to this, there was also a large display of culinary and domestic apparatus of the most approved and ingenious kinds. In regard to this exhibition, the *London Times* said that "America naturally took the lead." Australia was, in comparison, poorly represented. The effect of this exhibition can scarcely fail to be of great advantage to this country. Some two years ago, Mr. Atkinson, of Boston, suggested that there should be held at some convenient point in this country, an exhibition of

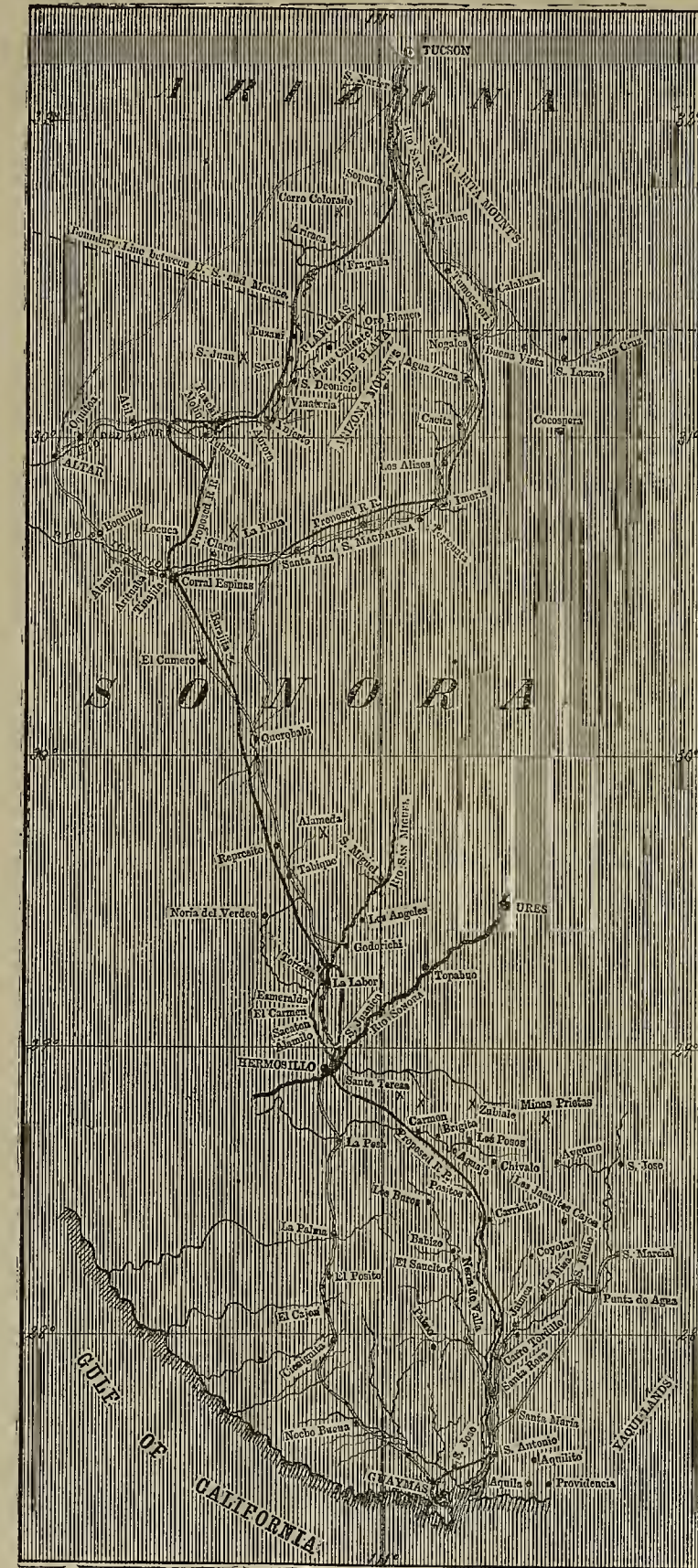
Cotton, the Cotton Plant, Machinery, Etc. At which the fiber and cotton goods of any description, together with the machinery for its manufacture; also cotton seed oil, oil meal, machinery for ginning, pressing, cultivating, etc., should be shown. He also suggested that it should form a part of the New York World's fair in 1883; but the idea grew so rapidly and took such large proportions that it was soon determined to make it a special exhibit at Atlanta, Ga., in October next.

We have now before us the full programme, with a view of the magnificent exhibition building which is in process of erection, and the elegant grounds with which it will be surrounded. It has fairly passed from a merely national feature and has assumed the character of an international exhibit. The enterprise will usher in a new era for Southern enterprise and industry, and presents one of the surest indications that the people of the South are taking a new departure in a more determined effort to rely upon themselves. A part of the building will be fitted up with the most improved cotton manufacturing machinery, all of which will be in operation, while a portion of the grounds will show the cotton in all stages of growth, from the young plant to the matured boll, with the pickers at work. Assurances have been received from English manufacturers and machine builders that they will be there in force. Japan and China and India will also be fully represented. The town of Atlanta has subscribed \$35,000 to meet any deficiencies that may arise over and above the necessary disbursements. Three New York firms have also

subscribed \$10,000 each, while numerous other parties have subscribed in smaller amounts.

A Second Exhibition of Building Material Was held in London in April last, continuing two weeks, which has been pronounced quite a success. The exhibit included architecture, construction, engineering, decoration, furniture, etc. Another exhibit of the same character is to be held in Brunswick, Germany, commencing July 1st. The notification of this exhibit reached the United States at so late a day that

and a very good show of machinery. The object of the exhibition was more to promote a better understanding of mutual interests than to add to the practical advance of the business. It partook more of the nature of a convention than that of an exhibition. But future exhibitions will probably assume more of a practical nature, and be designed to give a greater impetus to the rearing of sheep and the manufacturing of wool to the end, that we may grow at home the 50,000,000 lbs. of wool which we now import to keep our woolen looms in motion.



MAP OF SONORA, MEXICO, AND SURROUNDING COUNTRY.

no special effort will be made by our people to take any part in it. Had time permitted, the opportunity would have been a very favorable one for certain lines of manufacture, such as builder's hardware, plumber's goods, sashes, doors, blinds, etc.

#### The Carriage Builders.

Which are now a numerous guild, have held several conventions, and in October last, at their convention in Chicago, introduced an exhibition department, which will no doubt lead to an early and full exhibition of this great industry.

#### The Exhibit of Sheep and Wool

At Philadelphia a year ago brought together a large number of breeders and manufacturers,

The producers and manufacturers of the United States are gradually making every department of mechanical industry, one after another, their own, not only sufficiently so to supply the home demand, but also to be able to compete with the leading European nations for the general supply of the world. Europe, therefore, is taking the lead in class exhibitions. Besides those already referred to, we notice calls as follows:

An International Electric Exhibition at Paris, from the 1st to the 15th of August next, to be followed by a congress or convention the month following. The exhibition to be under the patronage of the French Government, the design being to bring together from every corner every species of apparatus which is designed

to develop, transmit, or otherwise utilize electricity.

An Exhibition of Machinery for Trades and Dairy Purposes will be held at Altona, near Hamburg, Germany, from August 18th to October 17th, 1881. The object of this exhibition is chiefly the improvement and development of the smaller trades and the dairy. It will consist of four groups, as follows: 1st. Power machines for trades. 2d. Work machines and tools for trades. 3d. Products of trades, manufactured by the machines and tools of 1st and 2d, and 4th, machines and implements for dairies. It is expected that many of our custom machine tool makers will compete in this exhibition.

A Balneological Exhibition was opened at Frankfort-on-the-Main, Germany, in May last, and will be continued until September next. This exhibition, as the name imports, is designed to illustrate the various systems of bathing and bath appliances, and kindred matters.

A Universal International Educational Exhibition is announced to be held at Brussels for 1883 or 1884.

The growing popularity and success of these modern industrial gatherings sufficiently demonstrates their increasing necessity, and it may be assumed that the nation which neglects such opportunities will lag far behind in the race for supremacy and power, both physical and intellectual.

### Sonora, Mexico.

The rich country of Sonora, the trade of which will probably be controlled by California, is about to be awakened from its lethargy by the screech of the locomotive whistle. Hundreds of miners are looking toward it as a territory where fortunes are to be made. The country is so closely connected, geographically and commercially, with Arizona, that we deem it proper in this issue to reproduce a map which shows the principal towns and mines, and this line of the proposed railroad to Guaymas. This is the Sonora railway. The outline map herewith presented, shows the location of the principal rivers and towns of the section of country through which the surveyed lines of this railway pass. The Mexican government has manifested its desire to encourage an enterprise of this kind by granting to several individuals, resident in San Francisco and Mexico, a concession whose terms are exceedingly liberal, comprising exemption from import duties and State and general taxes for a term of years, free right of way, a land grant of some 22,000 acres per mile, and other important privileges.

In addition to the main line, as laid down in the map, a branch line is projected, starting a short distance south of the Arizona border and running eastward through Mexican territory, across low Sierra Madre to the Rio Grande at or near El Paso, connecting with the Atchison, Topeka & Santa Fe railroad, the Denver & Rio Grande railway, the Texas & Pacific railway, or some other of the lines stretching out toward that focal point. The line at present under consideration, from Guaymas northward, passes through the heart of Sonora, a State whose mineral and agricultural resources, but partially developed, are superior to those of California, with a climate of great salubrity and an abundant rainfall to mature at least one crop a year, without irrigation. The distance from Guaymas to the border by the easternmost of the three surveyed routes, is 265 miles, and the cost for a broad gauge road is estimated at but \$3,500,000, or an average of but little more than \$13,000 per mile. This low estimate is based on the exceedingly favorable topography of the country through which it passes, the cheapness of Mexican and Indian labor available (which is less than the Chinese labor of California), the low cost of importing material under the exemption of duties granted by the concession, and other favorable circumstances.

The terminal point for the railway on the Gulf of California, 1,530 miles by water from San Francisco, is eminently the best on the western coast of Mexico, being superior to either San Blas or Mazatlan, and because of the trade winds, particularly desirable as a port for the trades of the East Indies and China. The bay consists of an inner and outer one, in all four or five miles in length, almost completely sheltered from the winds by the bold heights of Pajaros on the east and the islands of Terra Firma, San Vincente and Petayae on the west, leaving the channel narrow and deep between them. The tides are irregular, being governed by the winds of the gulf, seldom rising and falling more than four or five ft.

The harbor is capable of giving good anchorage to 200 vessels. The town of Guaymas contains some 7,000 inhabitants, and has an active trade, as it is the port of entry for nearly the whole country. Hermosillo is 100 miles from Guaymas, on the line of the proposed railway, and is the most considerable town on the route. It has about 1,200 inhabitants.

Surveyors are now engaged in running a line from the Southern Pacific railroad to an undetermined harbor, at the head of the Gulf of California, above Guaymas. This is supposed to be Point Isabel. The men are now at work, so that the exact route has not been definitely determined on. By looking at the line map and then at the large map of Arizona in this number of the Press, a good idea of the "lay of the land" will be given.

THE Charles Dickens mine, in Idaho, is spoken of as one of the richest on this coast.



## Arizona's Climate.

The following item, which we take from the *Arizona Miner*, will answer questions about the climate of the Territory:

In justice to Arizona, her newspapers cannot too often call attention to the mild, healthful climate of her mountains, foothills, mesas or table-lands, and higher valleys. Take, for a sample, the section of country around Prescott, ranging from 3,000 to 8,000 ft. above the level of the sea. Here, snow rarely falls to a great depth, even on the highest points. As for snow-drifts, they are almost unknown. Last winter was, of course, milder than most of its predecessors. Citizens of the lower valleys, who were here in January, February and March, marveled at the delightful weather, of a town that is nestled among pine-clad hills, about 6,500 ft. above the level of the ocean. The Legislature, which assembled in Prescott early in January, sat, in a large wooden building, with doors and windows open, two-thirds of the time. Soon after the close of the session some two ft. of snow fell, but it did not remain long. Since then we have been blessed with delightful weather. In May the thermometer at midday rarely indicates 30° in the shade, and the nights are cool enough to compel the use of two and three pairs of blankets. Persons who sleep in the open air are rarely, if ever, attacked by sickness of any sort, nor are those who snore in houses afflicted.

While boasting of our mountain climate, it is well to state that while the low valleys of our largest streams are, in summer, rather warm, winter in such valleys is a season of enjoyment, snow is almost unknown and hard frosts are not frequent.

Added to these blessings of climate, or, rather, climates, most of the water is good; earthquakes, destructive floods, tornadoes and other destructive phenomena of Nature have never visited the Territory, so that taking all in all, Arizonans should be the last people in the world to growl at their country.

## Saddle Mountain Coal Fields.

The newly discovered coal fields of Saddle Mountain, though not so extensive as those of Deer creek, produce equally as good coal and the same kind—bituminous—which bears every indication of being an excellent coal to coke for smelting purposes. These fields are situated about six miles east of San Pedro river, and four miles south of the Gila, on the line of 33° north latitude, according to Eckhoff and Rieck's map of Arizona for 1880. It is a little south of east from Florence, and a little east of south from Globe, and about 12 hours' ride on horseback from the latter place.

It is approachable with wagons without any grading, having a natural road right to the mines. There are now about 25 locations made of 160 acres each. Many of these claims are now being vigorously prospected with such means as the prospectors can command. Some of them are showing good coal and others looking very favorable. There are quite a number of veins all striking in the same general course, but as they lay almost flat, but few crop to the surface.

**AVERILL MIXED PAINT.**—It would hardly seem that the simple idea of preparing ready-mixed paint for general sale would create such a revolution in the use of paints as it has done. Before the Averill mixed paint came on the market, people had to buy lead, oil, color and dryers separate, and mix the paint themselves. As this required skill, few attempted it, but hired painters to do the work. Now, however, any small job of painting can be done by mixing a quantity to suit of Averill paint, which is ready mixed and prepared for use in any color. It is also purchased in large quantities by consumers who get a pint of uniform grade of excellence. This pioneer in mixed paints is composed of pure linseed oil, pure white lead, pure zinc and the best colors for tinting, which, by the patented process of manufacture, are united to produce a paint which is at once beautiful and durable. The "soluble glass" uniting the oil and pigments, the whole mass dries with a hard, rich, glossy appearance; and it will not chalk or peel off. The paint can be scrubbed or washed as occasion requires, when its freshness will be renewed. At the office of the general agent for the Pacific coast, O. S. Orrick, 403 Market street, we recently had occasion to note the great variety of colors and tints in which this paint is now mixed. Every possible shade is prepared, and it is put up in large or small packages, so one can procure the exact quantity required, without loss from waste.

**SILVER ORE ON THE TREES.**—The Wood River News tells: "Joe Bush, the prospector, who was called away to his home in Ogden suddenly last week, by sickness in his family, left a specimen with us which is a curiosity indeed. It is a veritable petrification of fir bark, and adhering to it as closely as metal to wall rock, is a chunk of pure galena ore, evidently rich in silver. This establishes the future wealth of the Wood River country beyond all doubt, for where one can abate out of the trees 300-ounce ore, it is a safe bet that this is a better region for the poor man than a placer country. The specimen is on exhibition at this office. Now, let our hostile exchanges trot out a more profitable region, and we'll join the gang to open it up."

## USEFUL INFORMATION.

**PRESERVATION OF INDIA RUBBER UNDER WATER.**—Great losses are often experienced by the users of India rubber tubing, on account of the brittleness which it often acquires in use. A writer in *Dingler's Journal* gives an encouraging account of his success in remedying the difficulty by laying the pipes in water which is often renewed. Even the thickest and stiffest tubes remain soft and pliable without any perceptible diminution of elasticity, and he has been unable to discover any trace of injurious change. For some uses he soaks the pipes in melted paraffine. When they are kept in water they undergo great changes of color, and upon cut surfaces they often appear greasy and bleached, but all the changes seem beneficial rather than otherwise. Thin rubber bands, however, often become so brittle that they can be easily rubbed into small pieces by the fingers.

**TESTING LUBRICANTS.**—A French expert, M. A. Remont, tests lubricants by the following method: He dissolves them in bisulphide of carbon, whereby soap, etc., remain behind. Fifteen grams of the oil obtained after evaporating the solution of bisulphide of carbon are treated for half an hour with 15 cubic centimeters of caustic soda (36° Baumé) and 15 cubic centimeters of alcohol (90%). The oil which cannot be converted into soap in this manner is weighed. The alkaline solution is warmed to remove the alcohol. It is precipitated with a solution of chloride of sodium filtered and washed. The precipitate is again treated with bisulphide of carbon. The mineral oil and resin remaining behind is weighed.

**BLEACHING IVORY.**—An English paper gives the following as a recipe in Sheffield for bleaching ivory for cutlery handles. The mode of procedure is as follows: Place, say, 2 quarts of peroxide of hydrogen in a stone pot, adding 4 oz. liq. ammon. fort. 880°, immerse the handles, and put over a common shop stove for 24 to 30 hours; the handles are then taken out and gradually dried in the air, not too quickly, or they would split. The deep color of the ivory is removed and a beautiful pearly-white ivory results when polished. The ivory is previously treated with a solution of common soda, to get rid of greasy matter and open the pores.

**IMPROVED CANNINO BOXES.**—A very simple and neat improvement has been effected in the preparation of the tin boxes now so extensively used for preserved foods. The body of the box has a beveled rim, upon the slope of which the cover is soldered. When the cover is smartly tapped round the edge it is expanded and the solder joint broken by the wedge action of the bevel. The box is thus opened without injury to the lid, while the present inconvenient and even dangerous process for cutting open these air-tight cases is entirely avoided. The improvement involves no additional cost, and the soldering is applied externally.

**SYRUP THAT WILL NOT FERMENT.**—O. Schlickum, in *Pharm. Zeit.*, strongly recommends an addition of 10% of alcohol to the water with which the ingredients are to be extracted. He has never seen syrup prepared in this way ferment. The best proportion of sugar to the liquid he finds to be as follows: Syrups made with a more or less alcoholic menstruum, three parts of sugar to every two parts, by weight, of liquid; syrups made with water alone, five parts of sugar to three parts, by weight, of liquid; fruit syrups, nine parts of sugar to five parts, by weight, of liquid.

**ENORMOUS PHOTOGRAPHS.**—The claim is made for Australia of having produced the largest photographic pictures in the world. These magnificent specimens of the art—not only in point of size, but in respect also of quality—were taken by Herr Holtermann, of Sydney; they are mounted on an endless band of paper, strengthened by linen, and are nearly 100 ft. in length. Among the subjects are two colossal panoramas of the cities of Sydney and Melbourne, each of about a dozen sheets joined together in one harmonious tone and depth. One picture, printed from a single negative, was five by three feet.

**STRATENA, the cement**, whose wonderful powers are so frequently exhibited upon the streets, is probably only the old Armenian cement. This is so strong that it will hold jewels in place, and is used for this purpose by the Armenian jewelers, who merely flatten the settings of their precious stones and then stick them in place upon the metal with this cement. It is made by dissolving isinglass in alcohol along with gum ammoniac. When well made it is perfectly transparent.

**REMOVAL OF FUSEL OIL AND CLARIFICATION OF LIQUORS.**—A few years since the following process was patented in Germany, which is now again recommended as standing the test of practice, for the above purpose: Eight litres of the liquor, tincture, elixir, etc., are agitated for a while with a mixture of 30 grams pure starch, 15 grams finely powdered albumen and 15 grams of powdered milk-sugar. After 24 hours the liquid will be found free from all fusel oil, of a brilliant transparency and greatly improved in taste.

**IMITATION LEATHER.**—The Japanese make a paper to imitate leather, in which the surface has every appearance of a finished skin, with extraordinary firmness and elasticity, and it can be subjected to washing without any injury from the water. These peculiarities are not so much due to the superior quality of the material as to the mode of manufacture, the surfaces remaining intact, even when the paper is very thick, while with us paper of this kind soon loses its firmness, and the grain is impaired. Japanese leather paper is made extensively at Flingawa, near Yeddo, the capital of the empire.

**HARVESTER HEADER.**—Don C. Matteson, Stockton, San Joaquin county, Cal. Dated May 3, 1881. No. 241,041. This invention relates to certain improvements in that class of grain harvesting machinery known as headers, and it consists in a combination of devices, by which the inventor is enabled by one set of gearing to drive both sickle and draper, and to throw either or both out of gear whenever desired, the draper being stopped while the sickle continues to run, or both may be stopped altogether. The advantage of this is greater simplicity of mechanism and a considerable saving in expense.

**TO REMOVE OIL THAT HAS DRIED UPON IRON OR BRASS.**—To effect this without scraping, a number of plans can be suggested. Ammonia (spirits of hartshorn), soda or soda lye, spirits of turpentine, a mixture of alcohol and ether, or benzine (petroleum spirit), may be used, and any one of them may be found to answer the purpose. The use of alkali (ammonia or soda) will probably prove the most effective; but it must be used cautiously, on account of its corrosive action, and afterwards thoroughly removed.

**TO POLISH BRASS.**—Pulverize a sufficient quantity of sal-ammoniac very finely and moisten it with soft water, rub the paste on the brass; which should be warmed meanwhile over some clear coals of wood; then rub dry with a soft leather, dusted with a mixture of bran and Spanish white. Another method is to wash the brass with a solution of one ounce of alum boiled in a pint of strong wood ash lye; when dry, polish with fine tripoli on a soft chamois leather.

## GOOD HEALTH.

## Cure for Whooping Cough.

Vapors from Purifying Boxes in Gas Works.

We have already given in these columns, the substance of the information contained in the following communication to the *New York Sun*; but we are now requested by a gentleman of this city who has tried it and found it successful, to give the article entire. The advantage of a prolonged visit to the gas works by any person afflicted with the whooping cough is well known, but it will be seen that the same benefit may be readily obtained by persons at their own homes.

TO THE EDITOR OF THE NEW YORK "SUN":—A friend sends me a slip cut from a recent edition of your journal, inquiring for a reliable remedy for whooping cough. I am enabled to give the desired information after actual experience in my own family, and through the equally favorable experience of more than a score of friends and neighbors who have tried it.

It is well known to most intelligent people that exposure of patients to the vapors arising from the purifying boxes in the gas works almost invariably relieves the terrible paroxysms, and, after repeated visits, cures have been frequently effected. This discovery was made by a physician of Paris, about 15 years ago.

The fact was published, and soon after visits began to be made to the Manhattan, New York, Brooklyn and other gas works, on the recommendation of our medical men. An epidemic of whooping cough raged in Newport in the winter of 1878. Over 200 patients, between the ages of two months and 75 years, visited the gas works. The treasurer of the company, Wm. A. Stedman, Esq., states that nearly all were benefited, and some were undoubtedly cured.

About that time the child of a distinguished chemist in Providence, R. I., was seriously ill with this terrible disease, and too weak to be taken to the gas works. The father procured a quantity of the liquid hydro-carbon deposited by condensation in the bottom of the purifying box, and vaporized it in a metal dish in the closed room of the little sufferer. Almost immediately it revived, the spasms were checked, and after a few days the child recovered and was as well as ever.

Microscopists have recently discovered that the cause of whooping cough (pertussis) is the rapid aggregation of bacteria under the root of the tongue. These must be destroyed before relief can be obtained. To this end such powerful medicine as quinine-bromide is given; but even that fails to reach the seat of the disease. Of course the ordinary expectorants are absolutely useless; change of air is rarely curative; hence the rapidly increasing percentage of deaths from this disease.

The New York Board of Health report for 1875 has a list of 489 deaths from whooping cough in that city. The deaths weekly in London, England, are from a minimum of 60 to a maximum of 220, over 6,000 annually.

Physicians generally inform the anxious parents that whooping cough must take its course, as a remedy is unknown, and they can only slightly relieve it; that the incubation and increase in violence will occupy six weeks, and from six weeks to six months will be required before it is entirely removed. The whoopings usually increase regularly in number from day to day to the fifth week, often equalling forty times in 24 hours. Very rarely is this disease preceded by any other, but so great is the strain upon the system that frequently it is followed by pneumonia, in which event death often ensues. A fatal termination is more generally the result of absolute physical exhaustion due to the great strain consequent upon the oft-recurring paroxysms.

A few years since my youngest child, never before ill, was stricken by this dreaded disease. The best medical talent was obtained, every known remedy tried, most watchful care constantly exercised, but without the slightest avail. The child actually coughed itself to death. With all the grief of this sad experience still fresh, in April, 1879, we were alarmed by a new incursion of the destroyer. Our children, five and seven years, were attacked, seemingly with the severity of the preceding case.

It was then I learned of this Providence chemist's discovery, and that simple but ingenious apparatus had been invented by which the hydro-carbon (by analysis found to be cresolene C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>O), could be evaporated in a closed room. I immediately procured both. The apparatus is a metal stand six inches high, supporting a cap, holding half an ounce of cresolene. The heat is applied either by a petroleum night-lamp or gas, vaporizers being made to attach to an ordinary gas-burner.

Cresolene is a rose-pink liquid, with a boiling point of 397°. It is not unpleasant in odor, but, on the other hand, is extremely grateful to anyone with the least bronchial or catarrhal affection.

In three minutes after the lamp was lighted, the vapor of the cresolene was diffused in every part of a room 15 by 20 ft. In 10 minutes the children manifested evident relief, recovered from their dull exhaustion, and were playing on the bed, even laughing aloud in their evident freedom from the paroxysm.

I was not advised it could be continued in safety all night, or even day or night, and at the expiration of 15 minutes extinguished the lamp. The children had been whooping 20 times a day. One of them did not even cough for 12 hours, the other for 36.

Learning that the vaporization could be continued day and night with more rapid benefit, I applied it for five nights in their sleeping-room. The spasms ceased and they speedily recovered. At that time an epidemic of whooping cough was raging in my vicinity. I advised my neighbors of this apparatus. Many of them were used, and with the best results.

I believe the vaporizers and cresolene are now to be obtained from druggists. I am confident it will be found equally efficient in all throat and lung diseases. Inhalation is the true mode of treatment. The apparatus is nearly perfect as an agent for deodorizing, disinfecting and perfuming not only the sick room but an entire house. It deserves an extended trial. RANOELEY.

**PEPSINE FOR TAPÉWORM.**—The tapeworm is able to live in the stomach because of its ability to resist the digestive action of the fluids normal to the stomach. In a stronger peptic solution the live worm succumbs and is digested like any other flesh. Accordingly a French physician treated with strong doses of pepsine a child who had passed segments of a large tapeworm. About 45 grains of pepsine were administered daily for five days. The child experienced no harm and showed no special symptoms. Then a proper dose of sulphate of peltierine with castor oil was given, and the discharges showed no signs of the worm. Subsequent experiments with vegetable pepsine—papaine—which is much more active, are said to have given very promising results. One child passed fragments of tapeworm ten inches in length, softened and partially digested.

**REMEDY FOR ACID BURNS.**—Since vitriol-throwing has become a common offense, it may be well to point out that in a case which occurred during a chemical lecture, described in the *Bulletin de Therapeutique*, in which two students were seriously injured in the face by the explosion of a flask containing boiling sulphuric acid, the intense suffering at first experienced ceased entirely about a quarter of an hour after the application of a soft paste of calcined magnesia and water in a layer about two millimeters in thickness. M. Alande states that the magnesia requires to be renewed in 24 hours, but that patients, after recovery, retain no marks of the accident.

**TATTOO MARKS MADE USEFUL.**—"Why is it," asks Dr. Le Comte, who is physician to a regiment of dragoons, "Why is it that each number of soldiers die upon the battle field?" And then he replies, confidently: "Simply because of the difficulty which arises in regard to arresting hemorrhages." The compression of an artery being the best mode of stopping profuse bleeding, Dr. Le Comte proposes to teach each soldier first where these vessels are situated, so that he may assist himself while waiting for the surgeon. Therefore, he tattoos an image of some kind upon every portion of the soldier's body where there is an artery.





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SAN FRANCISCO:

Saturday Morning, June 18, 1881.

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## Passing Events.

The "passing event" which interests us most just at this moment is the publication of this 36-page edition of the Press, and we trust it will interest our readers sufficiently to repay us our labor in preparing it. Space is so limited with us this week, every line being taken up with important matter, that under this heading we can have little to say. The Rodgers Arctic search expedition has departed on its mission; American horses have won victories in Europe; and—other items will be found of interest to all. A big miners' meeting will be held on the 24th of this month, at Nevada City, in behalf of the hydraulic mining interest. They will set before the people their side of the case.

## Our Arizona Edition.

This edition of the MINING AND SCIENTIFIC PRESS comprises 36 pages, including a fine map of Arizona and numerous illustrations. We have compiled a large amount of information about the Territory of Arizona which will be found in these pages. As to any extended remarks about the mining regions we have given all that from time to time in our columns and so refrain from it on this occasion. We confess, however, that limit of space has crowded out some matter already prepared.

Our map, to which we refer under another head, shows all the districts, rivers, cities, mines, railroads, etc. Our illustrations relate mainly to Arizona, though we have given considerable space to the subject of the electric light as applied to mines, and have also an engraving of a copper smelting furnace, an appliance now very much used in Arizona and elsewhere. The map of Sonora will be appreciated at this time, when so much attention is turned in that direction.

We trust our readers will appreciate our efforts to furnish them a good paper. We print several thousand extra copies of this issue of the Press, which will be scattered throughout the country. Though we have printed a great deal about Arizona, the usual variety will be found in our columns.

## Our Map.

The map of Arizona which we publish in this number of the Press was engraved from Kieckhefer's large map made last year. We have, however, made many corrections and additions. The line of the Southern Pacific railroad is now correct, Col. Gray, the Chief Engineer of the road, having placed it properly on the map for us. The stations on the Southern Pacific are all properly located. The line of the Atlantic and Pacific is located on this map. The route of the Atchison, Topeka and Santa Fe was incorrectly placed on the old map, but the correction has been made on this one. We are unable of course to locate the line of the branch road of the Southern Pacific to Point Isabel, as the surveyors are now at work running lines over two routes and nothing definite has been decided upon.

As to mines, a great many districts have been formed since the original map from which this was taken, was made. We have, however, added those new districts' names on the map. In addition, therefore, to the list of names on the side of the map, the names of many other districts will be found engraved in their proper places. We have endeavored to be as correct as possible in this, though a few errors may have crept in.

The map will be found useful for reference by all mining men, since the districts, mines, rivers, roads, etc., are all shown. Taken in connection with the descriptive matter found in this number of the Press, it will give a great deal of information about the thriving and growing Territory of Arizona.

## The Mining Bureau.

The State Mining Bureau, at present at 313 Pine street, will shortly be removed to new quarters, as the building is to be torn down to give place to a fine structure to be built by James G. Fair. Mr. Hanks has been looking for suitable rooms for some weeks, and will probably locate at the Grand Opera House on Mission street, near Third. There is a fine large room there, originally intended for an art gallery, and surrounding it are a number of smaller rooms. Mr. Hanks has not decided yet, but these are the only available quarters presenting themselves now.

## Contributions to the Geology of California.

### New Series.

No. 2. Section from Merced to Coulterville and Big Oak Flat.

H. G. HANKS, STATE MINERALOGIST: From Merced station upon the Southern Pacific railroad the line of section described in this contribution extends in a northeasterly direction nearly transverse to the line of strike of some of the most interesting gold-bearing rocks of the Sierra Nevada.

Merced is situated upon the alluvial plains of the San Joaquin. The level and clay soil, noted for its fertility and adaptation to cereals, extends without change to the six-mile house, where gravel begins to show itself and the soil is poorer and more arid. Another six miles over a gently rolling gravelly plain brings us to the banks of the Merced. Crossing by ferry to the right bank, we travel along the broad and rich bottom lands to Snellings and Merced falls, passing plantations of Indian corn and cotton.

At Merced falls, the first outcrop of the older rocks is observed. It is a hard bar of compact black clay slate, like roofing slate, very uniform in texture, in broad flat plates, standing vertically on edge, trending in remarkably straight lines northwest and southeast. This hard outcrop forms a natural dam, upon which the rapidly flowing water of the Merced has made but little impression. There is a fine water power at all seasons, which is partially utilized by a woolen mill. We here leave the river and ascend the hills to the northeast. The black slates carry numerous veins of white quartz which have not been much prospected.

A few miles beyond the falls, the surface rises rapidly, and the slates give way to harder rocks. These are light bluish-green in color, weathering in places almost white. They are evidently of sedimentary origin, though much altered and changed from their original condition. They form the outlying belt of a series of heavily bedded conglomerates, sandstones and shales, which, being harder and less susceptible to erosion than the slates, form the high hills and ridges. These elevations trend northwest and southeast, and are probably the northwestern extension of the Mount Oso range, which traverses a large portion of Mariposa county, and forms the western wall of Bear valley, on the Mariposa estate.

The heavy and bold outcrops of the massive conglomerates composing this range are not readily recognized as conglomerates. Their composite character is obscure. Generally it is scarcely possible to recognize that the rock is made up of rounded boulder-like masses. The boulders which form these rocks are so much compressed, welded, and united in one apparently homogeneous plasma that the dividing lines and contact surfaces are obliterated, and cannot be seen except upon surfaces that have been weathered and sometimes upon broad surfaces of fracture. Occasionally, where the metamorphic action has not been as strong as in other places, the original forms of the boulders can be made out, and the masses stand out from the general surface. In decomposing, these old conglomerates reveal their origin by yielding a vast amount of hard boulder-like masses, elongated and lens-shaped spheroids, which are utilized for fencing. These rocks are generally known and described as "greenstone," the color being light bluish green, and the mineral composition of the boulders being like the greenstones. They offer a very interesting subject of study to the lithologist and to the student of dynamical geology. They border on each side the belts of slates in which most of the quartz veins are found and have, next to the granites, best withstood the denuding and wearing forces of the elements, and thus have to a great extent determined the topography of the piedmont region of the Sierra Nevada.

Upon the line of the section herein described, such conglomerates occur in a number of parallel outcrops with slaty rocks between and belts of sandstone, the exact succession of which cannot be determined without painstaking investigation. The whole series occupies a breadth of about 20 miles between the slates of Merced falls and the cinnabar slates of Coulterville valley. It includes at least two bodies of well-defined pebbly conglomerate, in which the pebbles are small—not much larger than beans. These conglomerate beds lie parallel with beds of argillaceous slate, and clearly demonstrate a succession of deposits formed in alternating deep and shallow waters. Approaching Coulterville we descend the hills of greenstone conglomerate and pass suddenly upon the black slates of the valley. They greatly resemble the outcrops at Merced falls, and probably are a repetition of that series. Here, however, they are especially interesting, as the matrix of the two chief lines of gold-bearing veins in California, the so-called "mother lode" of the State. In this valley, as also upon the Mariposa and farther north, there are two nearly parallel lodes of great size, the croppings of which are so bold and prominent crowning the hills as to be visible for miles.

The western lode rises between walls of black slate, and carries films and sheets of the slate in its mass, giving to it a more or less stratified form and a striped appearance when seen in cross sections or as it stands in the mines. Such quartz is technically known as ribbon quartz, and is a great favorite with quartz miners. In the mother lode proper a short distance farther

east, the quartz is more massive and solid, and is in close proximity to a belt of serpentine, and for a great part of its course follows and penetrates a stratum of magnesian rock, referable to ankerite and magnesite. It is characterized by rusty outcrops and an abundance of a foliated, bright green mineral to which the name "Mariposita" has been given. It appears to owe its green color to chromium and iron rather than to copper or nickel. The quartz penetrates this magnesian rock so thoroughly as to form in many places a complete network of veins branching off from the chief body.

Beyond the veins and magnesian belt the slates are seen again for a short distance and are succeeded by greenstone conglomerates.

Beyond these, on the road to Big Oak Flat, there is a heavy body of syenites forming a hilly region traversed by the road for ten miles north and east to Priest's, on the Yosemite road. From Priest's, westward, there is a region of massive, hard black slates, which appear to belong to the series of formations in which the limestone belt of Sonora and the Hita group of veins occur. I regard them as older than the mother lode series of slates and believe that they belong to the period of the carboniferous, the reasons in part for this belief being their stratigraphical relations to other formations and the abundance of carbonaceous matter which they contain.

The mother lode slates have been shown to correspond in age to the Jurassic period. I am inclined to refer the greenstone conglomerates series to the trias.

The whole series of formations embraced in the section give satisfactory evidences of extensive plication and subsequent erosion. The dips are generally eastward and at a high angle.

WM. P. BLAKE.

## Our Home Industries.

Machinery Oils from California Products.

Among the important home industries in our midst which illustrate California's advancement as a manufacturing State, are those of the oil and paint, and oil business, since we are now quite independent of Eastern manufacturers in this branch. One of our leading houses in this line, which has distinguished itself for its successful encouragement of home production in this line of business, is the well-known firm of A. C. Dietz & Co. This house, established some 30 years since, is one of the oldest in the State. It was first located on Montgomery street, then the principal business street of the city. At that time, in addition to a general business in paints and oils, the manufacture of camphana burning fluid, largely consumed in those days, was begun by this firm, and this supply was continued till its use was superseded by kerosene. Since that date, owing to the changes which have taken place in the location of the wholesale trade, and the steady expansion of their business, Messrs. A. C. Dietz & Co. have made several removals, on each occasion to large and more commodious quarters. The change recently made by this house, from No. 224 to No. 9 Front street, is well worthy of mention. The edifice is a substantial one of brick and iron, three stories high. The basement is used for the storage of various kinds of oils, of which a large stock is carried in tanks, hogheads and barrels. Access from this part of the building to the stories above is had by an elevator.

The first, or street floor, used for the principal sales-room and for offices, is excellently arranged, and includes, among other conveniences, a telephone for the use of the firm and its customers. On the right of the entrance from the street, is a convenient office for the display of samples, for shipping and other purposes. The remainder of this floor, except that portion appropriated for counting-rooms, is utilized for the display and storage of the numerous brands and qualities of oils, paints, varnishes, glues, brushes and other articles in the line of goods manufactured and dealt in by the house. The story above, the second, contains a large stock of dry paints, zincs, shellacs, lanterns of various kinds, beadlike chandeliers, lamps, wicks and a full assortment of kerosene fixtures of all sorts. The upper floor is used for the storage and shipment of lamps of all kinds, lanterns of various patterns, including those for ship's use, which are a specialty with Messrs. A. C. Dietz & Co., and of which a large stock is carried, glass chimneys, cotton waste, etc.

We have heretofore mentioned that Messrs. A. C. Dietz & Co. have long been identified with home manufactures. This firm recently established a factory at Berkeley, known as the "Berkeley Lubricating Oil Company." At this refinery they make all the machinery oils from California products. The crude oils come from Vantura, where they are produced in large quantities. The oils manufactured by them embrace cylinder, leather and all kinds of lubricants suitable for mining machinery, railroad use, etc., as well as illuminating oils, which are said to be of superior quality. The latter include the Mineral Solar oil, a high fire test oil of 300°, for use on steamers and elsewhere, and the well-known Headlight 175° test oil for locomotive and mill use. The firm also supply the Prizal Medal oil, for ordinary lighting purposes. The Berkeley Lubricating company is now turning out some 100 barrels of lubricating and manufacturing oils daily, and it is anticipated that the supply from this source will soon be sufficient for all local requirements.



## The Brush Electric Light.

It is now some six years since Mr. Charles F. Brush, of Cleveland, Ohio, produced the now famous system of electric lighting named after this brilliant inventor. During this period, the Brush electric light has gained the foremost rank, and is to-day pre-eminently the most perfect and widely used system of electric lighting in the world, over ninety per cent. of the total lights in use being of this pattern.

The California Electric Light Co., No. 119

mile in diameter, as light at the farthest point as it would be with a gas lamp of usual street size every hundred feet. The trial showed this requirement to be more than fulfilled, as it was light enough at much more than that distance to tell the time on a watch, or read coarse print. Over 10,000 people witnessed the test.

This is the plan that has been proposed for the lighting of the Capitol and its surroundings at Washington. It is proposed to place upon the dome of the Capitol and upon six towers surrounding it, at a distance of 1,000 ft. from it, no less than 450 electric lights, each of 6,000 candle power, or a total light of 2,700,000 candle power, equal to 200,000 4-ft. gas burners.

facture their own carbons, making the whole installation still more peculiar to themselves.

The Brush machine, a general view of which is given in Fig. 1, possesses some points of resemblance to the dynamo-electric machines of Gramme and of Wallace-Farmer, as well as to the magneto-electric machines of M. de Meritens, while at the same time its principle of construction differs from that of all others, and confers upon it at once its special excellence and its originality.

Its point of resemblance to M. Gramme's machine consists in the fact that its armature is of annular shape, a form of construction first adapted to the purpose by M. Gramme some 13 years

ago, iron which from the enlarged section are brought into as close proximity to the poles of the field magnets as are the outsides of the coils themselves. It is this difference from the Gramme ring which constitutes the similarity between the Brush armature and that of M. de Meritens, but the Brush machine differs in all other essential respects from the latter machine in the disposition of its coils, in its method of connection, in the method and arrangement of the magnetic field, and in the continuous nature of its current.

The Brush machine, however, differs altogether from the Gramme generator in the disposition of its field magnets and the relative positions of

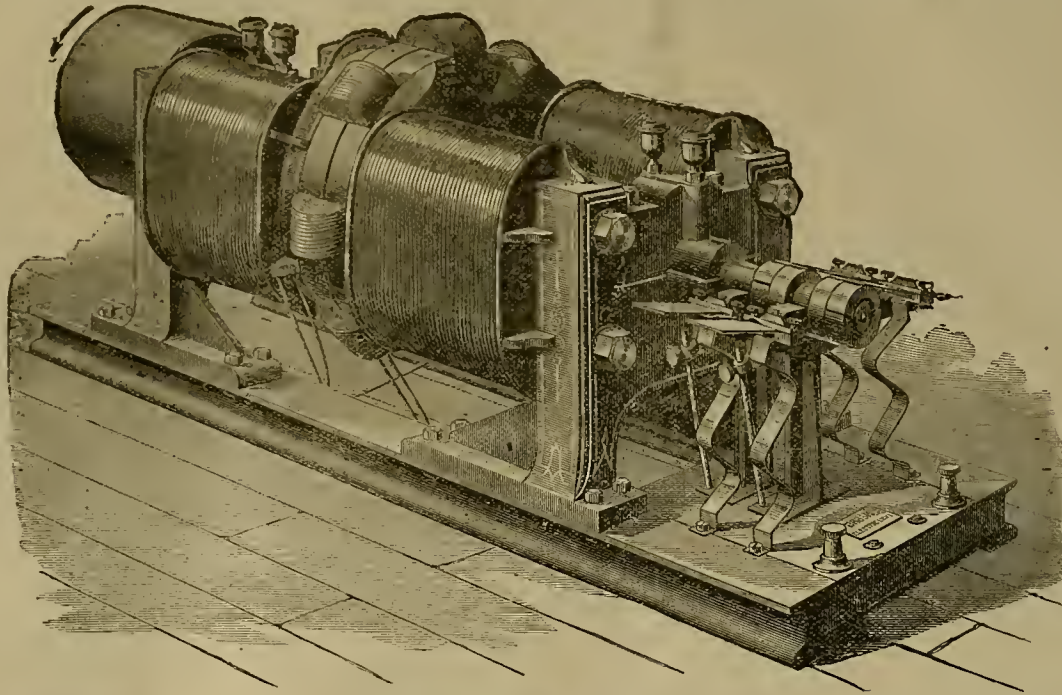


Fig. 1.

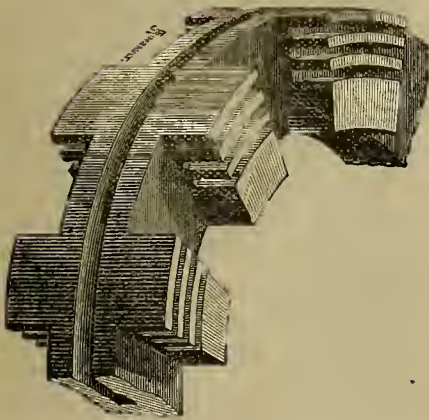


Fig. 2.

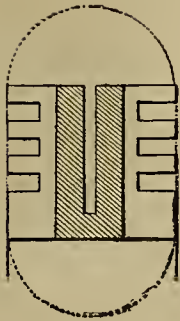


Fig. 3.

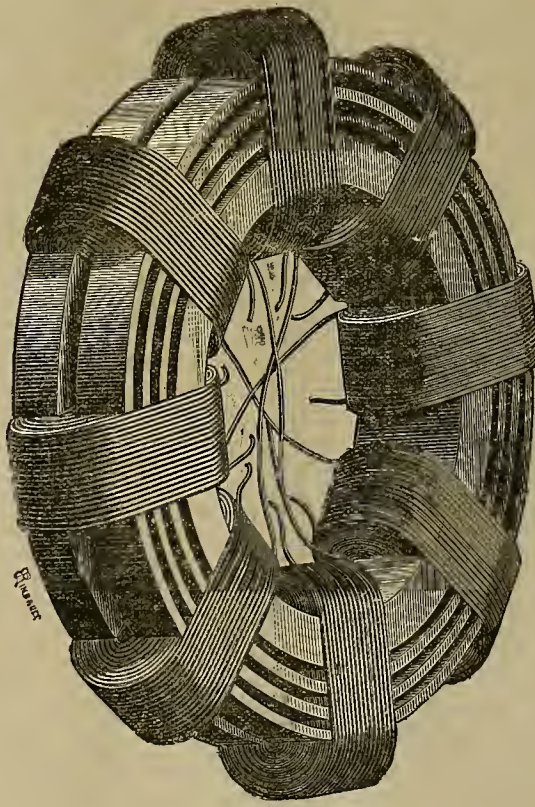


Fig. 4.

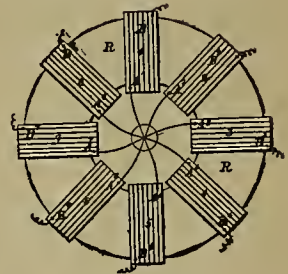


Fig. 5.

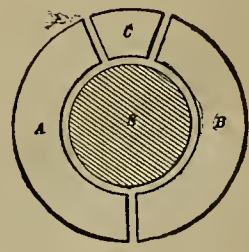


Fig. 6.

## THE BRUSH DYNAMO-ELECTRIC MACHINE.

O'Farrell street, San Francisco, is the fortunate possessor of the Brush patents for the Pacific Coast. We are glad to note its introduction into hydraulic mines, mills, smelting works, etc. One hydraulic miner says: "It enables us to operate the mine at night practically as well as day." And, after two years' constant use, says: "It continues to give uniform and satisfactory results." Thus showing its durability. But there seems to be a larger and more important field for the electric light, viz: city lighting from an elevation, known as the tower system. We notice that the Brush Co. is successfully lighting Wabash, Indiana; Akron, Ohio, and other cities in the East, in this way, and are pleased to know that arrangements are being made to light several cities on this Coast by the tower system. The Boston Daily Advertiser says, regarding Wabash, Indiana:

The contract was that the lights (four lights elevated 200 ft.), should illuminate a circle one

The effect of such an enormous massing of light at such a distance above the ground and surrounding buildings would produce a surprising effect, and within a considerable area would, no doubt, be practically equal to daylight. If this plan is carried out the Brush light will be used. This subject will be brought to the attention of the next session of Congress.

We take the following complete scientific description of the Brush system from the London *Engineering*, and will at a later date publish a description of the system written by Mr. Brush himself:

The Brush, like the Siemens system, includes both generator and regulator peculiar to itself, and may, therefore, be looked upon as complete in itself, differing in that respect from all those so-called systems which are represented by either a particular form of machine or a special arrangement of lamp, and like the proprietors of the Siemens system, the Brush company manu-

ago. The Brush armature differs, however, from the Gramme ring in the arrangement and disposition of the helices of wire with which it is wound, as well as in the way in which the several coils are connected with one another. In the Gramme armature the coils are wound contiguously to one another, so as entirely to envelop the iron core, hiding it completely from view, and they are permanently connected to one another in consecutive series. In the Brush armature the diametrically opposite hobbins are alone permanently connected together, and a current generated in one pair of hobbins does not necessarily traverse all the others, and, in fact, never does, as will be pointed out in the course of this notice. Again, the individual coils are separated from one another by a considerable sector of the iron ring, which is of larger sectional area between the coils (see Fig. 2), so that in the revolution of the armature within the magnetic field, the coils alternate with masses of

the revolving helices and the magnetic field. In the disposition of its magnets the Brush machine more nearly resembles the Wallace-Farmer apparatus, but their form is entirely different, and the armature of the Wallace-Farmer bears no sort of resemblance to the Brush ring, its coils being more allied to those of M. Loutin's machine than to any other of the characteristic generators. Having thus pointed out the position occupied by the Brush machine with respect to other typical generators, showing wherein it approaches and wherein it departs from the machines of other systems, we will proceed to describe its construction.

The most characteristic feature of the Brush machine lies in the form and construction of its armature, which consists of a cast iron ring, the cross section of which is generally rectangular, but in the direction of its circumference it is alternately wide and narrow, as shown in the sketch, Fig. 2, which represents a portion of the



iron armature ring and explains its construction better than can be given by description. On reference to this figure it will be seen that the ring is divided up into as many sectors as there are bobbins to be wound, by a number of rectangular depressions or grooves; in these the coils of insulated copper wire are wound until the groove is filled up and the flat converging recesses become flush with the face of the intermediate thicker portions or pole pieces by which they are separated from one another. Fig. 3 is a cross section of one side of the ring taken through one of these portions, and it will be observed on reference to both figures that the intermediate thicker portions of the ring are grooved out by a series of deep concentric grooves, the object of which is partly to reduce the mass and lessen the weight of the revolving armature, partly for the purpose of ventilating the ring and thus carrying away a portion of the heat generated by the working of the machine, but chiefly for the localization and isolation of local currents generated by induction in the iron, and which would tend not only to reduce the efficiency of the machine by diminishing the magnetic capacity of the armature, but also to produce a heating of the ring, and, therefore, of the coils, whereby a portion of the current would be lost through their resistance being increased. For a similar reason the periphery of the ring is grooved out deeply so as almost to sever the ring; by this means all cross currents are effectually cut off and induction currents are compelled to flow in directions which are not detrimental to the efficiency of the machine. This again increases the area of radiating or cooling surface, and consequently helps to prevent the armature becoming overheated.

In what is called the 16-light machine, which may be regarded as the normal size of the Brush generator, the armature ring is 20 inches in diameter, and it is wound with eight radial coils of cotton-covered copper wire, of No. 14 B. W. G., whose middle planes radiate from the axis or rotation, being distributed round the ring at equal angular distances apart of 45 degrees. Each coil contains about 900 ft. of wire weighing about 20 lbs., and is wound in the rectangular grooves or spaces shown in Fig. 2, filling up the space completely, so that the vertical faces of all the coils are flush with the vertical faces of the thicker portions of the iron ring. Fig. 4 is a sketch of the armature ring with all its coils wound, which must be looked upon rather as an explanatory diagram than as an illustration of the proportions of this part of the apparatus. The two sides of each groove, and therefore of each coil of wires, are parallel to the center line or radial plane of the coil, and by the adoption of that form of bobbin one of the practical difficulties in the winding of annular armatures of the ordinary form is avoided. All the coils are, like those in the Gramme machine, wound in the same direction.

Fig. 5 is a diagram illustrative not only of the distribution of the coils around the rings, but of the method by which the connections are made. The inner end of each of the coils is connected by a wire to the inner end of the corresponding coil at the opposite end of the same diameter of the ring; and the other ends of all the coils are brought through the shaft of the machine, and are connected to corresponding portions of the commutator, where the currents are collected by suitably placed copper plates or brushes. Referring to the diagram, it will be seen that the inner end,  $a^1$ , of the coil, 1, is connected to  $a^5$ , which is the inner end of the coil, 5;  $a^2$  is connected to  $a^6$ ,  $a^3$  to  $a^7$ , and so on round the ring, and the outer ends,  $b^1$ ,  $b^2$ ,  $b^3$ , etc., are all connected to the commutator by conducting wires insulated from one another. The two free ends of each pair of diametrically opposed coils are, after passing through the shaft of the machine, attached respectively to two diametrically opposite segments of the same commutator, which segments are insulated from one another and from any other pairs of coils. The commutator, which is attached to and rotates with the driving shaft of the machine, consists of a set of separated copper rings or flat cylinders, of which there are as many on the shaft as there are pairs of coils on the armature, and each of these cylinders consists of two segments insulated from one another, on one side of the shaft, by a small air space about one-eighth of an inch wide, and on the other by a piece of copper separated from the segments by two smaller air spaces. The arrangement is shown in Fig. 6, in which  $a$  and  $b$  are the two segments connected respectively to corresponding coils on opposite sides of the armature, and attached by an insulating material to the shaft;  $c$  is the copper insulating piece, the object of which is to separate either of the flat copper brushes or collectors, which press upon the periphery of the commutator, from either of the segments during the interval occupied by one pair of coils passing the vertical, or in other words through the neutral portion of the magnetic field; this occurs twice in each revolution of the armature, and therefore of the commutator. At the time when any pair of bobbins is in this way cut out of the general circuit, their own circuit is open, so that no current can circulate or be induced in them. By this most ingenious arrangement each pair of coils has in succession in each revolution a period of rest equal to one-quarter of a revolution, and has a current passing through it for only 75% of the time the machine is running; to it is, in great measure, due the very small development of heat in the working of the Brush machine, and it presents also another important element of efficiency to the machine, namely, that each pair of bobbins as it passes the neutral portion of the magnetic field, and is therefore incapable of doing work and contributing electromotive force to the general current, is itself cut out of the cir-

cuit, and thus two causes operating against the efficiency of the machine are eliminated; the first is one common to most armatures which have, like that in the Gramme machine, a permanently closed circuit, namely, that the currents generated in the bobbins have two routes open to them; the one through the conductors and commutators to the brushes, and the other through the idle bobbins, and thus by a species of short circuiting, robbing the external circuit of some of its current. The other cause of inefficiency which is avoided in the Brush machine is the reduction of its internal resistance by an amount equal to the resistance of two of the bobbins, for just as a certain amount of resistance is an item of efficiency when belonging to coils which are doing work and contributing electromotive force to the general current, so does it become an element of inefficiency when belonging to coils which are idle, for in that case it diminishes the current supplied by the active coils while at the same time contributing no current of its own in compensation. By the arrangement of commutator referred to above, Mr. Brush has, therefore, got rid of two considerable drawbacks to the efficiency of the machine.

What is, however, one of the important features of the Brush machine is the arrangement of the magnets by which the magnetic field is produced, and by which the armature coils are, during their revolution, almost continually passing through a very intense magnetic field. Upon reference to Fig. 1, it will be seen that the armature ring is closely embraced on each side by the large horizontal electro-magnets whose poles are expanded so as to be presented to three of the armature coils on each side, leaving one pair of coils free from their direct influence, and this is the pair which is passing through the neutral region of the magnetic field. For the sake of illustration, the disposition of the magnets toward the armature and toward one another may be described as two horseshoe electro-magnets opposite one another in a horizontal position, their similar poles being presented toward one another, and having a small space between them

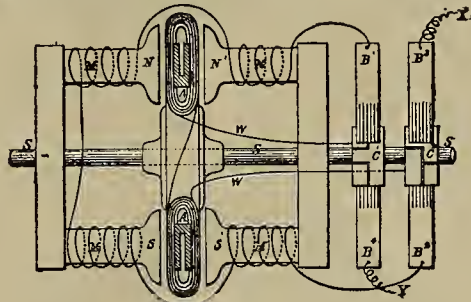


Fig. 7.

in which rotates the armature ring. This space in the machines we are describing is, however, so nearly equal to the thickness of the armature that there is hardly any clearance between them, the high class workmanship of the apparatus allowing such close working with perfect safety.

The methods of exciting the field magnets in dynamo-electric machines are very different under different systems. In the early Gramme machines a separate armature was set apart for producing the current which, by traversing the magnet coils, produced the magnetic field between their poles, and the current from this armature had no other work to do, the useful or external current being taken direct from one or more other armature rings attached to the same shaft. The excitement of the magnets in one machine by a current supplied from another or from a special armature of the same machine was first suggested and employed by Mr. Wilde, of Manchester, whose name, and that of Mr. Holmes, must ever be associated with the early history of the production of electricity by mechanical means. In the latter form of the Gramme machine, as well as in the ordinary Siemens machine, the whole of the current from the armature is transmitted through the magnet coils, they forming, with respect to the armature, a portion of the external circuit. In other systems, such as the Lontin, the Jablockhoff-Gramme, the Siemens alternating current machine, and in extensive installations of the Siemens machine, the field magnets of one or more generators are excited by the current from a special machine which has no other work to do; and in a special form of the Siemens machine the magnet coils form a shunt circuit to the armature, by which arrangement the machine acts to a great extent as its own regulator.

The system adopted in the Brush machine is, however, different to all to which we have just referred, while it has certain points of similarity to all. In the Brush machine the current contributed by each pair of bobbins on the armature is switched by the commutators alternately through the magnet coils and through the external circuit, so that each bobbin in its revolution "feeds" alternately the magnets and the lamps; and at any one position of the armature alternate bobbins are feeding the magnets while the rest are sending their currents to the "line," while at the next eighth part of a revolution, those which were feeding the line are switched on to the magnets, and vice versa. Fig. 7 is a diagram illustrating the connection between the armature bobbins and the magnet coils at the time when the commutators are placing them in the same circuit. Referring to this diagram,  $m$  and  $m^1$ , are the two magnets having their similar poles presented toward one another on opposite sides of the armature coils,  $a$  and  $a^1$ . Thus the coil,  $a$ , is under the influence of a mag-

netic field produced by the two north poles,  $n$  and  $n^1$ , while at the same time its corresponding bobbin,  $a^1$ , is under the influence of the two south poles,  $s$  and  $s^1$ ; a current is therefore induced in the pair of bobbins,  $a$  and  $a^1$ , which is transmitted by wires passing through the shaft,  $s$ , to the commutator,  $c^1$  and  $c^2$ , whence it is collected by the brushes,  $b^1$  and  $b^2$ , and by them transmitted to the magnet coils, which are all collected together in series, and at the same time the other portions of the commutators (which are in connection with the other working armature bobbins) are in contact with the brushes,  $b^3$  and  $b^4$ , by which they are placed into the external circuit of the machine.

One of the most original and interesting features of the Brush machine is the commutating apparatus, which, by the simplest of mechanical means, collects and distributes the currents from the active armature coils, sending them into the magnet helices or into the "line," according to their position in the magnetic field, and cutting out of circuit the armature coils one by one as they pass through the neutral region between the poles. The whole commutating apparatus is fairly represented on the extreme right of the general view of the machine (Fig. 1), and consists of two pair of rings of the form shown in Fig. 6, attached to and revolving with the main shaft, and, therefore, their position is fixed with respect to the revolving armature of the machine. On to the cylindrical circumferences of these rings are pressed two pairs of copper collecting brushes, which rub tangentially against the commutator rings, one pair pressing above and the other pair pressing below, a line forming the points of contact being a diameter of the ring. The copper "brushes," as they are called, are flat strips of elastic copper about two inches wide, cut at the ends, which press against the rings into eight tongues, so as somewhat to resemble a grainer's comb, and each comb or brush is wide enough to cover or be in contact with two armature rings, and in this way, although two of the coils are insulated twice in each revolution, the main circuit is never inter-

rupted. The disposition of the brushes with respect to the commutators will clearly be understood by comparing Fig. 1 with Fig. 7.

For the sake of adjusting the brushes so as to make contact with the commutators at the most effective angular position with respect to the magnetic field, they are mounted to the opposite ends of two rocking levers, which are capable of oscillating on the driving shaft, and can be fixed in any desired position by means of a set-screw, which clamps a stout wire rising from the base of the machine. The currents are conveyed from the brushes by wide strips of thin sheet copper, shown in the general view, and in order to allow for the variable distance of the free ends of the brushes from the base of the machine, they are made undulating or wavy, doubling up as the distance is shortened and stretching out when it is increased.

The average total resistance of the 16-light machine, as now constructed, is about 11 ohms, to which the eight coils of the armature contribute about five ohms, that is 0.625 ohm each, and the magnet coils about six ohms, or 1.5 ohm for each helix—the resistance of the connections, conductors, contacts, etc., within the machine being inconsiderable.

#### The Lamps.

The regulating electric lamps designed by Mr. Brush, are quite as much an element of the remarkable success of his system of electric lighting as are the machines themselves, and while their performance is surpassed by no other regulator, and although they contain special contrivances to enable them to maintain a steady arc when burning 16 or more together in a single circuit, they are probably the simplest in construction of arc regulators, involving no clock-work or complicated feeding mechanism, or indeed anything that is liable to become deranged. They can be constructed to burn continuously for 8, 16, 24, or indeed for any desired number of hours, and the mere hanging of a lamp in its place puts it thereby into the circuit of the other lamps of the series, and with the machine; while, on the other hand, the extinction of one or more lamps, or indeed their removal altogether, does not affect the others except (if the machine be driven at the same speed) to make them brighter; but by driving the engine slower and therefore using less steam, the same initial degree of illumination can be maintained in each of, say 14 lamps, as if all the 16 were in operation. The great simplicity of the Brush lamp consists in the fact that the feed is actuated by gravity alone, while it is controlled solely by the influence upon a bar of iron of a magnetic field, the intensity of which varies with the strength of the electric current passing through the lamp circuit. The general external appearance of three forms of Brush regulators

is shown on the opposite page in Figs. 8, 9, and 10; the first representing the single carbon, or 8-hour lamp, the second, the double carbon or 16-hour lamp, with its glass globe removed; and the last is a sketch of a more ornate form of the double carbon lamp, the controlling apparatus being inclosed in a nickel-plated case. In all these lamps, which are designed for general illumination, the lower carbons are fixed, and as they burn away the upper carbons follow them, so the arc gradually descends, but for certain special installations, such as lighthouses or for purposes of projection, a focus-keeping arrangement has to be applied.

Like most of the modern electric lamps, the upper carbon descends by its own weight until it touches the lower carbon, and the circuit is thereby completed; the effect of this in the lamps we are describing, is to cause a soft iron plunger to be drawn to a more or less extent within a hollow coil, or sucking magnet, as it is sometimes expressively called; and through the intervention of a lever and a most ingenious annular clutch surrounding the rod of the upper carbon like a washer, the upper carbon is lifted away from the lower, and the arc is established. As the carbons burn away, the arc has a tendency to become longer, and its resistance to increase and this by diminishing the strength of the current, diminishes the supporting power of the magnetic helix, allowing its plunger to descend, and, in so doing, to lower the carbon and shorten the arc until the proper strength of the current is restored, when the rising of the plunger once more holds the carbon in position. In the above very general description we have advisedly spoken of the influences as *tending* to produce the effects, for, as a matter of fact, so sensitive is the controlling apparatus to the smallest variation of current, that there is practically no reciprocating action, such as the above description might suggest, but the normal condition of the upper rod is to be slowly sliding through the clamp as the carbons become shorter, but if by any chance the rod slides a little too far, the clutch immediately raises it again and the carbons are adjusted to their proper distance.

All who are familiar with the great difficulties which hitherto have appeared to be almost inseparable from the burning of several arc lights in a single circuit, will know that a number of regulators constructed from the above very general and incomplete description, and with no other controlling contrivance, would be totally incapable of burning uniformly in a single circuit, and it is the extremely simple and ingenious method by which each lamp controls itself independently of the action of all the others in the circuit, and yet independently on the strength of the current in that circuit, that constitutes at once the great originality and the great perfection of the Brush regulator.

At first sight the problem might appear to be insoluble, but Mr. Brush has solved it in the following manner. Each of the bobbins of the controlling magnet is wound with two distinct coils of wire, the first consisting of a number of turns of thick wire, through which the current is transmitted to the arc, and the second of a much larger number of convolutions of fine wire which form a secondary or shunt circuit between the terminals of the lamp, the connections being made in such a way that the electric current shall pass through it in a direction opposite to that in the primary of thick wire circuit, forming a shunt circuit of high resistance through the lamp, which, being always closed, is independent of the arc. It will readily be understood that, as the current flows in opposite directions around the magnet, the influence of the fine wire circuit will be to neutralize or weaken the attractive influence of the thicker helix, but the number of the convolutions of the two coils, as well as their respective resistances, are so proportioned to one another that the attractive influence of the primary helix (when the arc is of its normal length) shall overcome the influence of the secondary circuit. Owing to the greater resistance of the latter, not more than one per cent. of the main current is transmitted by the fine wire helix, but its magnetic influence is rendered considerable by its greater number of convolutions.

From the above description it is clear that since the electric current has two routes from one terminal of the lamp to the other, the one through the arc and the other independent of it, it follows that should the arc become too long, its resistance will increase, and a larger proportion of the current will be shunted through the fine wire helix, while the strength of that in the thicker helix will diminish, the resultant magnetic influence on the plunger will be reduced, and the upper carbon will be brought closer to the lower; on the other hand, if the arc becomes shorter than its normal length, its resistance is reduced, more current flows through the primary helix, and less through the secondary, and the carbons are drawn farther apart.

Fig. 11 is a diagrammatic sketch showing the course of the primary circuit, and illustrating the general principle by which the arc is controlled; it also shows the short circuiting contrivance by which any accident to one lamp, or irregularity of working, cuts it out of the general circuit, and does so without exercising any influence upon the other lamps in the series. In this diagram,  $x$  and  $y$  represent the two terminals of the lamp, which, in most cases, consists of hooks, which, being hung over pins attached to the ceiling—and which are in connection with the line circuit—place the lamp in circuit with the machine. The current entering at  $x$  is transmitted through the two hollow bobbins,  $h$  and  $h^1$ , in parallel circuit, the outgoing ends being joined together and connected to the upper carbon holder,  $z$ , and if the carbons



are in contact, the current flows through them, and by the vertical rods of the lamp to the terminal hook, *y*; the effect of this is to convert the solenoids, *k* and *k'*, into magnets, which, by drawing into themselves the two iron plungers, *n* and *n'*, lift one edge of the washer clutch, *w*, which by its oblique action, seizes the carbon rod (much in the same way as a tent-rope tightener grasps its cord) and lifts the upper carbon until its influence is balanced by that of the fine wire helix, which, it must be remembered, surrounds the thicker coil.

The short-circuiting apparatus shown to the left of the carbons (see Fig. 11), consists of an electro-magnet, *t*, wound with a thick and a fine wire coil similar to those of the regulating solenoids, but both wound in the same direction. When the thick wire circuit of this magnet is

system are, before being used, a foot long, and are electro-plated with a thin covering of copper; they last for about eight hours, during which time about 9½ inches of the positive and about 4 inches of the negative carbon are consumed. When, however, the lamps are required to burn for a longer period, double carbon lamps are employed, fitted with two pairs of carbon holders, as shown in Fig. 9, and each is controlled in the same way as in the single carbon lamp, but the controlling apparatus is not duplicated. When the lamp is put into action, the arc is formed between one of the pairs of carbon, and, when they have burned out, the other pair automatically starts into action and continues to burn until it is in turn consumed; in this way the time of burning is doubled, and in order to extend the period of burning, it is

takes its grip before the other begins to act, and consequently lifts its corresponding carbon higher than its neighbor; the consequence is that only one arc is established, viz., across the lesser distance, and in all the subsequent feeding and controlling the pair of carbons first started are alone affected, because, although both carbons are raised and lowered together, the lower end of the reserve carbon is always higher than the other by the difference in the height of the two pairs of jaws on the frame, *k*. A time arrives, however, when, owing to the shortening of the consuming carbons, they can no longer meet when the frame is dropped, and the current by which they are again separated can only be transmitted by the reserve carbons coming into contact; the circuit is thereby completed, the new carbons are separated, and the

and with a remarkably small loss, and this is of especial advantage where several lights have to be employed, because if there are as many long conductors as there are lamps, then the whole of the loss of current due to the resistance of the cables must be borne by each lamp, whereas if a number of lights can be included in a single circuit, the loss of current from the resistance of conducting cables is equally divided among all the lamps in the series. There are, of course, commercial advantages in burning a number of lights in a single circuit from one machine, for there must necessarily be an enormous increase in prime cost in the adoption of a number of dynamo-electric machines in the place of one, as well as in the multiplication of conducting cables, and the advantage in point of attendance and repairs is obviously in favor of the

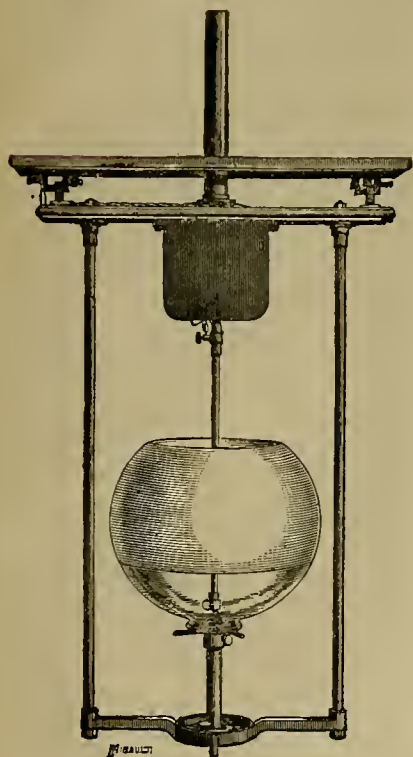


Fig. 8.

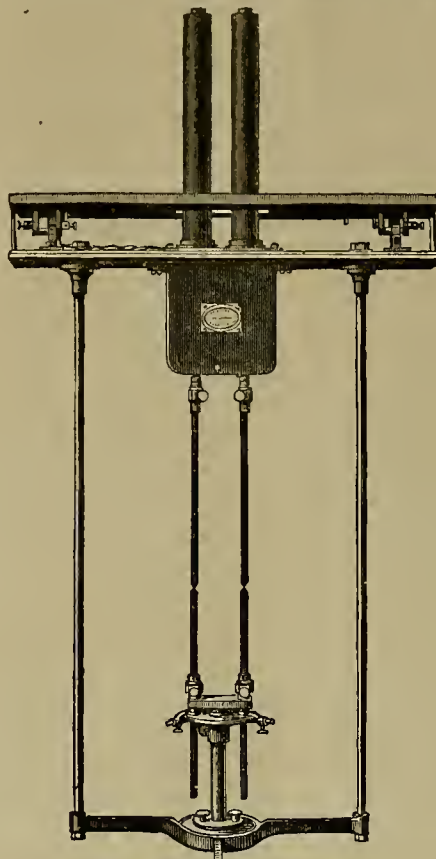


Fig. 9.

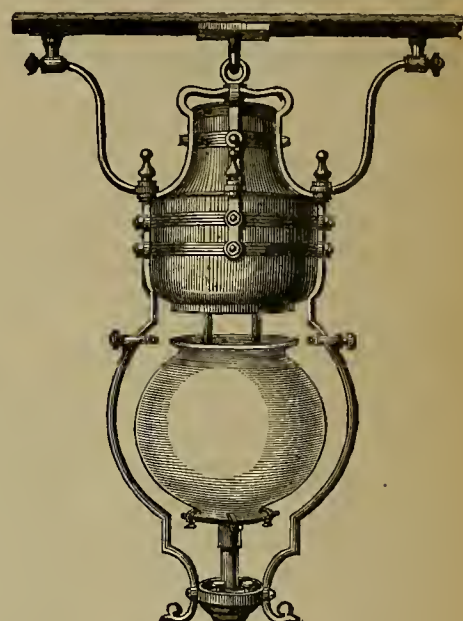


Fig. 10.

## THE BRUSH ELECTRIC LAMP.

complete, it forms a shunt of low resistance between the terminals, and, therefore, short-circuits the lamp, transmitting the current to the main circuit. Now, the fine wire wound upon this magnet is in circuit with the fine wire of the regulating solenoids; it follows, therefore, that if the failure of the arc, or through its becoming

only necessary to employ a lamp with a third pair of carbons, when it will be capable of illuminating for 24 hours, each additional pair of carbons extending the period of burning for another 8 hours.

The change from the one pair of carbons to the new pair is effected by purely mechanical

arc between them continues to be controlled by the magnet and clutch in the same way as the first arc was.

The great simplicity of the Brush lamp may not at first be appreciated from the above description, for in the action of the lamp, electric phenomena of a somewhat complex nature oc-

single machine system.

With respect to the advantage of being able to operate a number of lights at a considerable distance from the machine, it is an interesting fact that the sixteen lights, which are now in regular use for the illumination of Charing Cross terminus, are actuated by a machine work-

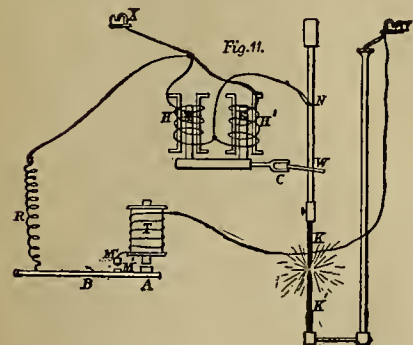


Fig. 11.

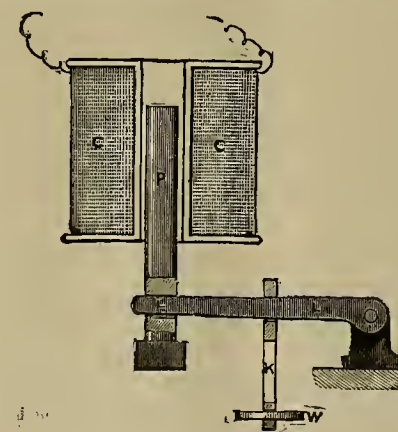


Fig. 13.

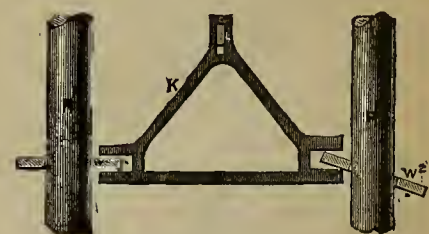


Fig. 12.

abnormally long, or through any considerable increase in its resistance, a larger proportion of current be diverted through the fine wire circuit, the attractive force of the electro-magnet, *t*, would be increased and its armature, *a*, which is attached to the pivoted lever, *b*, would be attracted, the contact pieces, *m* and *m'*, would thereby be brought together, and the terminals would be short-circuited through the thick coil, *m*, and the resistance spring, *r*. By thus short-circuiting the terminals through a route altogether independent of either the fine or the thick wire solenoids, their magnetic action ceases, and either the upper carbon is dropped, or, if it is burned out, or from any other cause the arc is not established, the contact pieces, *m* and *m'*, are held firmly together by the attraction of the magnet, *t*, and the current flows past the faulty lamp to the others in the series, its extinction calling attention to it, while the other lamps become proportionately brighter.

The carbon pencil consumed under the Brush

means, and by a contrivance the ingenuity of which is only measurable by its extreme simplicity. This little apparatus will be understood by reference to the explanatory diagram, Figs. 12 and 13, which also more clearly illustrate the action of the washer-clutch than the preceding figure. *c* is the hollow solenoid or "sucking magnet," which exercises a magnetic influence upon the soft iron plunger, *p*. The rising or falling of this plunger raises or lowers the little frame, *k* (shown in both figures), by the intervention of the lever, *l*; *r* and *r'* are the carbon rods which pass vertically through the casing of the lamp, and *w*<sup>1</sup> and *w*<sup>2</sup> are the clutch-washers which surround them. One side of each of these washers passes between a pair of jaws forming part of the little frame, *k*, and when the latter is drawn upward, its action is first to tilt the washers, and then to cause them to clutch the rod on diagonally opposite corners. By the very simple device of making one pair of jaws a little higher than the other, it

cur; that is to say, the various courses of several different simultaneous circuits of different resistances have to be followed and considered, and this renders a description more complicated; but no one could examine a Brush lamp with its case removed or watch its action without being struck with its extreme simplicity and remarkable efficiency.

The Brush system of electric lighting is remarkable as being the only one which, to our knowledge, is capable of establishing a large number of large arc lights in a single circuit, and it would be difficult to overestimate the great value of this distinctive property for the purpose of public illumination. Under other large arc systems each lamp must have a separate machine, and there must, of course, be as many lengths of leading wires as there are lamps and machines. It possesses also another very special advantage, and that is that a series of lights may be maintained by the Brush system at a great distance from the machine,

in the Anglo-American company's works in Lambeth, and that within a few weeks a large area of the city of London will be illuminated by the same system by forty lamps, all operated in one circuit by a machine working in the Lambeth works.—*Engineering*.

ALASKA PEBBLES.—D. H. Jackson, who recently returned from Alaska, brought home with him a lot of quartz pebbles as curiosities, they being worn as smooth and almost as round as marbles. As they were nearly pure white in color, no one thought of their containing any metal except Supt. Boyle, of the Alta, on the Comstock. He thought the pebbles looked as if they might contain something of value. The *Enterprise* says he had some of them pounded up and assayed, when they showed gold at the rate of \$16 per ton. The pebbles were picked up at the mouth of the Chiloat river, where they form the head. Good mines will probably be found somewhere up that river.



## Color of Minerals.

In a recent number we had a brief article on this subject, giving the general principles with regard to the color of minerals. Some examples of color and names will be valuable to miners. The following eight colors are selected by Dana as fundamental to facilitate the employment of this character in the descriptions of minerals: white, gray, black, blue, green, yellow, red and brown. From the chapter on this subject in Dana's Text-book of Mineralogy, we take the following:

## The Metallic Colors are:

1. *Copper-red*—native copper. 2. *Bronze-yellow*—pyrrhotite. 3. *Brass-yellow*—chalcopyrite. 4. *Gold-yellow*. 5. *Silver-white*—native silver, less distinct in arsenopyrite. 6. *Tin-white*—mercury, cobaltite. 7. *Lead-gray*—galenite, molybdenite. 8. *Steel-gray*—nearly the color of fine-grained steel on a recent fracture; native platinum, and palladium.

## The Non-metallic Colors are:

A. WHITE. 1. *Snow-white*—Carraramarble. 2. *Reddish-white*—some varieties of calcite and quartz. 3. *Yellowish-white*—some varieties of calcite and quartz. 4. *Grayish-white*—some varieties of calcite and quartz. 5. *Greenish-white*—talc. 6. *Milk-white*—white, slightly bluish; some chalcedony.

B. GRAY. 1. *Bluish-gray*—gray, inclining to a dirty blue color. 2. *Pearl-gray*—gray, mixed with red and blue; cerargyrite. 3. *Smoke-gray*—gray, with some brown; flint. 4. *Greenish-gray*—gray, with some green; cat's eye, some varieties of talc. 5. *Yellowish-gray*—some varieties of compact limestone. 6. *Ash-gray*—the purest gray color; zoisite.

C. BLACK. 1. *Grayish-black*—black, mixed with gray (without any green, brown or blue tints); basalt, Lydian stone. 2. *Velvet-black*—pure black; obsidian, black tourmaline. 3. *Greenish-black*—augite. 4. *Brownish-black*—brown coal, lignite. 5. *Bluish-black*—black coal.

D. BLUE. 1. *Blackish-blue*—dark varieties of azurite. 2. *Azure blue*—a clear shade of bright blue; pale varieties of azurite, bright varieties of lazulite. 3. *Violet-blue*—blue, mixed with red; amethyst, fluorite. 4. *Lavender-blue*—blue, with some red and much gray. 5. *Prussian-blue*, or Berlin blue—pure blue; sapphire, cyanite. 6. *Smalt-blue*—some varieties of gypsum. 7. *Indigo-blue*—blue with black and green; blue tourmaline. 8. *Sky-blue*—pale blue with a little green; it is called mountain blue by painters.

E. GREEN. 1. *Verdigris-green*—green inclining to blue; some feldspar (amazon-stone). 2. *Celandine-green*—green with blue and gray; some varieties of talc and beryl. It is the color of the leaves of the celandine (*Chelidonium majus*). 3. *Mountain-green*—green with much blue; beryl. 4. *Leek-green*—green with some brown; the color of leaves of garlic; distinctly seen in prase, a variety of quartz. 5. *Emerald-green*—pure deep green; emerald. 6. *Apple-green*—light green with some yellow; chrysoprase. 7. *Grass-green*—bright green with more yellow; green diallage. 8. *Pistachio-green*—yellowish green with some brown; epidote. 9. *Asparagus-green*—pale green with much yellow; asparagus stone (apatite). 10. *Blackish-green*—serpentine. 11. *Olive-green*—dark green with much brown and yellow; chrysolite. 12. *Oil-green*—the color of olive oil; beryl, pitchstone. 13. *Siskin-green*—light green much inclining to yellow; uranite.

F. YELLOW. 1. *Sulphur-yellow*—sulphur. 2. *Straw-yellow*—pale yellow; topaz. 3. *Wax-yellow*—grayish yellow with some brown; blende, opal. 4. *Honey-yellow*—yellow with some red and brown; calcite. 5. *Lemon-yellow*—sulphur, orpiment. 6. *Ochre-yellow*—yellow with brown; yellow ochre. 7. *Wine-yellow*—topaz and fluorite. 8. *Cream-yellow*—some varieties of lithomarge. 9. *Orange-yellow*—orpiment.

G. RED. 1. *Aurora-red*—red with much yellow; some realgar. 2. *Hyacinth-red*—red with yellow and some brown; hyacinth garnet. 3. *Brick-red*—polyhalite, some jasper. 4. *Scarlet-red*—bright red with a tinge of yellow; cinnabar. 5. *Blood-red*—dark red with some yellow; pyrope. 6. *Flesh-red*—feldspar. 7. *Carmin-red*—pure red; ruby sapphire. 8. *Rose-red*—rose quartz. 9. *Crimson-red*—ruby. 10. *Peach-blossom-red*—red with white and gray; lepidolite. 11. *Columbine-red*—deep red with some blue; garnet. 12. *Cherry-red*—dark red with some blue and brown; spinel, some jasper. 13. *Brownish-red*—jasper, limonite.

H. BROWN. 1. *Reddish-brown*—garnet, zircon. 2. *Clove-brown*—brown with red and some blue; axinite. 3. *Hair-brown*—wood opal. 4. *Broccoli-brown*—brown with blue, red and gray; zircon. 5. *Chestnut-brown*—pure brown. 6. *Yellowish-brown*—jasper. 7. *Pinchbeck-brown*—yellowish brown with a metallic or metallic-pearly lustre; several varieties of talc, bronzite. 8. *Wood-brown*—color of old wood nearly rotten; some specimens of asbestos. 9. *Liver-brown*—brown with some gray and green; jasper. 10. *Blackish-brown*—bituminous coal, brown coal.

## Peculiarities in the Arrangement of Colors.

**Play of Colors.**—An appearance of several prismatic colors in rapid succession on turning the mineral. This property belongs in perfection to the diamond; it is also observed in precious opal, and is most brilliant by candle-light.

**Change of Colors.**—Each particular color ap-

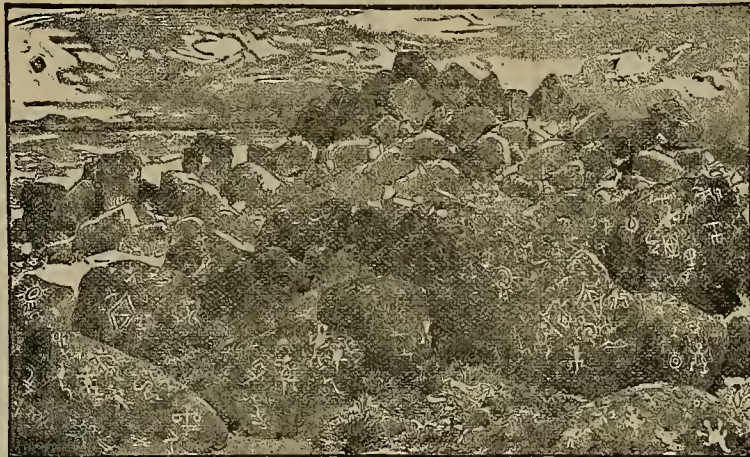
pears to pervade a larger space than in the play of colors, and the succession produced by turning the mineral is less rapid; Ex. labradorite. **Opalescence.**—A milky or pearly reflection from the interior of a specimen. Observed in some opal and in cat's eye.

**Tarnish.**—A metallic surface is tarnished when its color differs from that obtained by fracture; Ex. hornblende. A surface possesses the steel tarnish when it presents the superficial blue color of tempered steel; Ex. columbite. The tarnish is *irised* when it exhibits fixed prismatic colors; Ex. hematite of Elba. These tarnish and iris colors of minerals are owing to a thin surface film, proceeding from different sources, either from a change in the surface of the mineral, or foreign incrustation; hydrated iron oxide, usually formed from pyrite, is one of the most common causes of it, and produces the colors on anthracite and hematite.

**Asterism.**—This name is given to the peculiar, star-like rays of light observed in certain directions in some minerals by reflected or transmitted light. This is seen in the form of a six-rayed star in sapphire, and is also well shown in mica from South Burgess, Canada. In the former case it has been attributed by Volger to a repeated lamellar twinning; in the other case, by Rose, to the presence of minute inclosed crystals which are a uniaxial mica, according to DesCloizeaux. Crystalline planes, which have been artificially etched, also sometimes exhibit asterism. In general, the phenomenon is explained by Schrauf as caused by the interference of the light, due to fine striations or some other cause.

## Painted Rocks.

We give on this page a view of objects of historic interest, the "painted rocks" of Arizona. Mr. Conklin's account of his observations on the painted rocks is as follows: One of the leading features of interest to the traveler in the



THE PAINTED ROCKS OF ARIZONA—Piedras Pintadas.

mesa land of Arizona is the system of prehistoric landmarks he is constantly coming in contact with. It is in these features that Arizona presents herself as the land for the archaeologist and all curious minds. Among the foremost of these are the "Painted Rocks." (*Piedras Pintadas*.)

About six miles from Oatman's Flat, on an extensive plain, encircled by the famous Arizona mountains, is to be seen the largest and most perfect specimens of these Painted Rocks (*Piedras Pintadas*). They are in the Gila valley, 120 miles from Tucson, latitude, 33°, longitude, 113°. To stop and examine these wonders of the pre-historic age, is only to enhance the great enchantment that waylays the traveler in Arizona on every hand. They are a mass of rocks, evidently piled by some physical power, ages ago. They are massed together in a heap about 50 feet high, with a proportionate base; and while some are of a size that may be lifted by a man, others might be ranked with howlders. On these rocks or stones, are various figures and images. Figures, geometrical, comic, and anatomical. There are squares, circles, triangles, crosses, snakes, toads and vermin, men without heads and dogs without tails.

**A CHEAP PUMP FOR MINES.**—At the Yellow Jacket mine on the Comstock, when about to commence the attack on the water of the lower levels, Superintendent Taylor caused a lift-pump to be made for use in the main shaft. For the barrel of the pump he took a section of ordinary 14-inch pump column, and fitted into it the necessary bucket and valves. Although, owing to the altitude, a lift-pump will only raise water effectively to a height of about twenty feet, yet this was found to do excellent work as far as it would work at all. The only disadvantage was the trouble of the frequent lowerings required. Mr. Taylor was so well pleased with the work done by the first pump that he caused a second to be made, the pair can then be shoved down a side at a time, always keeping one at work in the water. The cost of rigging up such a pump to any company who happen to have on hand a spare pump column is a mere trifle. In many situations such pumps will be found exceedingly useful in lifting water to the tanks of the main line of plunger-pumps.

## Miners' Rights to Surface Ground.

In the case of the National Mining and Exploring Co. against Richard McNeal *et al*, tried in the District Court at Helena, Montana, a short time since, several very important mining questions were ruled upon by Chief Justice Wade. Plaintiff had located the Little Muddy lode, the location embracing a parallelogram 1,500 ft. long and 600 ft. wide.

Subsequently to the filing of this location in the Recorder's office, defendants entered within the boundary lines of the Little Muddy location, discovered and sunk a shaft upon a lead whose apex appeared upon the surface there, named their discovery the Mac Lode and located the same, the boundary lines of their location embracing several hundred feet of the surface ground of the Little Muddy location.

Plaintiffs sued defendants as trespassers and for an injunction, etc. Defendants claimed that plaintiffs' Little Muddy location was not valid in law for several reasons, among them because of a failure to make a discovery of a valuable mineral deposit with a well defined wall, and because the location was not made along the line of the vein, it being claimed that the side lines extended more than 300 ft. from the center of the vein.

The court held that the wall rock, etc., were essential to a proper discovery to entitle a party to make a valid location, but that if a proper discovery had been made the failure to make the boundaries of the location correspond to the course of the vein would not affect the plaintiff's right to the possession of his surface ground; and that an entry by another person upon such surface ground for the purpose of making a discovery would be unauthorized; and that entry would be a trespass.

The instructions upon this point were voluminous, but the following embraces the principle.



THE PAINTED ROCKS OF ARIZONA—Piedras Pintadas.

pal points involved with reference to the question of surface rights:

"It is not necessary in order to entitle a party to make a location of a lode and surface ground that the exact course of the vein should be accurately described. A party making a location will be presumed to have made in accordance with the course of the vein until the contrary is shown, the consequence of a mistake not being to deprive him of the surface ground contained within the boundaries of his location, but only affect the vein itself by circumscribing its limits.

## Jumping Claims.

Behold the prospector who wandereth over the face of the earth.

He traverseth the hills and picketh the barren mountains with his pick.

The pangs of hunger grip his bowels in the morning, and at night he lieth down with only a blanket to cover him.

And the graybacks come forth and rend him. And he lifteth up the voice of lamentation in the wilderness and crieth aloud to heaven:

"Why has this affliction come upon me, and why do the terrors of hell compass me round about?"

And while he sleeps, the wolves devour his substance.

And when he findeth the croppings, he diggeth in the ground and sticketh up the location notice on a board.

He then hieth to the valleys, and sayeth to the capitalist:

"Hearken unto me, for I have struck it big. Here are the samples from the ground, and behold the gold maketh lousy the rock with its richness."

And the twain return to find others toiling upon their claim.

And the prospector graspeth his gun, saying:

"Get ye from here, for this is holy ground." And a fire coming out of the hush smiteth him on the hip, and he calleth with a loud voice:

"I'm done for; take off my boots!"

And he giveth up the ghost and is gathered to his fathers.

And, behold others worked the mine.—*Nevada Monthly*.

## Arizona's Wealth.

The mineral resources of this Territory of Arizona are somewhat marvellous. The developments being made show such an abundance of gold and silver ore as has been never dreamed of before. Even those who have always felt full confidence in the mineral outcome of our Territory are astonished at this numerous wonderful developments being made. Yet the present condition of this prospective value of our resources is still in its infancy. But a fraction of the mineral-bearing portions of Arizona has as yet been prospected, and thousands of mines are to be discovered that will yield an abundance of wealth to the world, equal to the best. In Northern Arizona there are large stretches of country, yet untroubled by the foot of civilized man, that are undoubtedly well supplied with mineral leads as the best yet found. As the country is settled up, the daring prospector will find his way into the unexplored hills and reap the rich reward of wealth there awaiting him. Even about the most developed portion of our Territory but a small portion of the mineral leads of great value has been discovered, and the advancing years will bring new developments as startling as some of the present ones. There is practically no limit to the mineral resources of Arizona, and the rule that its mines increase in value the deeper they are developed, surrounds our resources with a confidence in their permanence that will bring ready capital to our doors, seeking investment in mines. Time will show that a better field for profitable mining exists in Arizona than in Sonora, and the mistake of precipitate investments in the latter State will soon react in favor of our own Territory, and a legitimate boom of prosperity will be felt throughout the whole country.—*Tucson Citizen*.

**SAVING SULPHURETS.**—We take the following from the Nevada Transcript: The Providence mining company have ordered 16 Frue concentrators for their new 40-stamp mill, and the machines will arrive here this week. The first Frue machine was brought to this county two years ago last month, and the invention was then coldly received. Since then it has been growing in favor. Of the mines in this locality, the Murchie has eight, the Wyoming eight, the Merrifield eight, the Nevada City four, the Mountaineer two and the Pioneer Reduction Works two, making, when added to the ones for the Providence, 48 in the township. We do not know of a solitary instance where they have failed to give perfect satisfaction. The sulphuret production of every mine adopting them has been more than doubled by their use. Several other mines hereabouts are making arrangements to put them in their mills.

**TELL US THE NEWS.**—We emphatically second the following from the Nevada Transcript: At a time when the mining industry is encouraged by the confidence of the investing public, there is no good reason for the withholding of information of interest to shareholders. The present is the most momentous, and shareholders have a right to know, not only as to the prospects and workings of the mine, but also of the management. The press stands ever ready to give reliable information; and when shareholders ask for particulars as to the properties they have invested in and are rebuffed, the press has but one remedy, and that is exposure whenever and wherever the fraud is found. Wild cat mining must be rebuked. There are too many good dividend-paying properties, whose reputations must not be tarnished by even the remotest contact with the illegitimate.

**THE JOHN DAY COUNTRY.**—A dispatch from Portland, Oregon, says: Capt. Chas. Bendire, of the First Cavalry, stationed at Walla Walla, an eminent naturalist, will visit the John Day country for the purpose of collecting fossils and other material for the Smithsonian Institute, and at the same time will measure the streams and collect data regarding birds, trout and reptiles. Capt. Bendire takes issue with Prof. Jordan and other scientists claiming that the celebrated redfish of the Walla Walla lakes to be the blue-back silver-side salmon. His collection of birds' eggs—the largest in this country, and for which he has been offered \$10,000—will be put in as perfect form as possible and presented to Harvard University.

**DUN GLEN.**—Deputy Assessor Buckner informs the Silver State that times are lively in Dun Glen, and there is considerable activity among mine owners. The new ore body in the Lang Syne is looking well and the ore is said to be rich in gold. The Auburn company have 20 men at work developing their mines, and the prospects are quite encouraging in many of the openings on the ledges. The company, he learned, now feels safe in having a mill built, as there is ore enough in sight to keep it running for a long time.

**I X L** and Pike Hollow districts are in Churchill county, Nevada. I X L district is on the east side of the Stillwater range, while Pike Hollow is on the west side. It takes a long time to develop a mining camp with limited means, and this has been the unfortunate circumstance of I X L. But there seems to be no doubt of the ultimate success of this camp, although Pike Hollow has, to-day, the brightest prospects, and will probably have the first mill in active operation.



## Botanizing in Arizona.

EDITORS PRESS:—As you saw us at the Oakland depot when starting for Arizona, and expressed so much interest in our journeys and successes, we take pleasure in reporting proceedings thus far.

No lovelier scene, so far as flowers go, can be met with anywhere than the fields, roadsides and hills of the San Joaquin valley at the time of our rapid passage through them on the Overland train. Belts of gold, and brown, and orange, and white striped the green carpeting in the most beautiful manner. My artist wife often exclaimed: "I have never seen one-half as much color before on a landscape. If I should put one-fourth as much on canvas, everyone would call the picture overdrawn."

Unfortunately, as at present arranged, the passenger train reaches Merced late, and traverses all the Tehachapi region, with its noted loop, also the curious Mohave desert, in the night. Emerging from the long San Fernando tunnel into the Los Angeles fields, we were disappointed to find them dry and backward this season, so falling below in rich display of color the lower San Joaquin described.

So, also, was found the whole valley traversed by the railroad to Colton. The San Bernardino hills at the same date of last year were the most glorious objects my eyes ever beheld; this year scarcely relieved from haze to crown from the dull brown, dry herbage and red soil by a single stripe of crimson poppies.

On the San Geronimo pass the flora was better again, the highest point being quite radiant with profuse flowers, but as soon as the descent began into the horrible Colorado desert, goodbye to the last vestige of green or flowery things.

The traveler who has heretofore crossed this desert in the night (as per late time-card) and thought himself cheated of fine scenery, can now, by new regulations, cross it by day, but as for sights, mercy on us! You look out through closed windows upon a glaring, white alkali plain, from which the train shakes up and envelopes all in a dense cloud of hot, pungent dust that insinuates itself through the window casings and nearly stifles you. When, happily, the dust subsides, and green bushes of the palo verde begin to appear, and the green line of poplars bordering the Colorado are descried, the conductor, if asked, informs you that you have just passed over the bed of an ancient sea, and for some 17 miles you were over 250 ft. below the level of the ocean.

The Colorado, muddy, shallow and full of snags, seems a wonderful river to persist so long a time in connecting the great rivers of the Rocky mountains by his deep winding canyons with the Gulf of California. On its western bank in California is located the little town of El Rio, composed of a quartz mill and other buildings owned by W. W. Van Arsdale. Here we stepped off and botanized the river bottoms and hills for two days, enjoying the hospitality of Mr. V. and family. A few leguminous plants, particularly shrubs, constitute the principal flora of the region. Among these are the two kinds of mesquite (*Prosopis*), the iron wood (*Olneya*), the three species of palo verde (*Parkinsonia*), several species of *Dalea*, etc. Chief of these in attractiveness are the several species of palo verde, or green stick, as its Spanish name implies. The whole bush, which is sometimes almost tree-like in proportions, is of a bright green color, owing to the character of the bark. It is always thin and never covered by the usual corky, outer bark. The long waving or pendent branches are entirely leafless for most of the year. Only for a few days in winter the merest little apology for leaves appear, soon falling away.

This seems to be an adaptation of subject to environment. Through the cycles of time, this tree has suffered more and more from the scorching of its leaves or lungs by the excessive heat, and so has learned to dispense with them altogether, and now changes its cambium to sap by aeration, through its evergreen and thin bark.

## In Arizona.

At the historic old adobe city of Yuma, on the other bank of the Colorado, we paused for only an hour. Not a green plant to be seen, except the ever-present creosote bush (*Larrea Mexicana*), gave opportunity to study Indian character—the subjects of all ages and both sexes being abundant. These Yumms are now a peaceful, non-hunting tribe, still governed by the noted old chief, Pascual—straight as an arrow, over six feet high, and said to be about 100 years old. His mother, a very mummy in appearance, lives with the chief, near the old fort. Strong belief is entertained that she must be about 120 years old.

The next pause was at Casa Grande, a station named from the famous old Aztec ruin about 20 miles distant. Here we had an interrum of 15 minutes with the celebrated Pauline Cushman, once a very successful Union spy—equally heroic in a dozen other noble and hazardous undertakings.

Three hours after, the train rolled along through the green grain fields of the sunken Santa Cruz and brought up at the new addition to the old Spanish town of Tucson, the largest and richest city between Los Angeles and the Gulf of Mexico. A day was all we could spend looking over this quaint old town, with its inhabitants of nearly all nations, particularly dark ones, but fast being brightened by the admixture of dozens of white persons by

every train since just one year ago. The next day we hired a wagoner to bring us and our botanical paraphernalia, bedding, provisions, etc., out here, six miles to a stick-and-mud cabin, just at the base of the first foothills of the

We have established a temporary camp in a cave near a little spring at the very base of the highest peak of the mountains, and often visit it two or three nights in succession. From this secure retreat from prowling natives we sally



AN APACHE INDIAN.

wonderful Santa Catarina mountains five miles away. This is headquarters for a fortnight or so, being a good place to dry out and study plants. The plains are very dry and barren, but the mountains bear their usual flora.

out in the early morning packed with botanical portfolios, food and water for the day, and at once proceed to climb the rugged steep, contending all the way against the thorns of the mesquite, the bayonets of yucca and the fiendish



AN APACHE SQUAW AND PAPPOOSE.

We packed ourselves, (wife and I), with blankets, provisions, botanical paper, etc., at once and started for the distant mountains, toiling along amidst the hot sand or over the numerous hills, beset with thorny mesquite bushes or with the ten-times-more-to-be-dreaded cacti, with keen, harped, stinging needles. Oh how we have been punished whenever too hasty or heedless.

needles of cacti, each of these terrible defensive plants being found clinging to the very pinnacles of these mountains, as if guarding vast treasures.

After a long day of weary, painful climbing we retreat to the cave and pass the night. Next day we must rest and dry out our plants gathered. The second day we climb again, and so the rare or new plants of the mountains of the

Santa Catarina are being gathered. Thus are your late Oakland citizens rusticated and enjoying themselves, while adding now and then a new plant or a valuable fact to the common stock of knowledge.

To-morrow we return to the cave and from there commence a week's exploration of the highest peaks and passes, with what success or adventures you may be advised, if such items are desired.

J. G. LEMMON.  
Botanical Camp, Foothills of Santa Catarina, Arizona.

## Clay Deposits of California.

The matter of the clay deposits of the State is too important to be put off with a general notice. It will be the duty of the State Mineralogist to thoroughly investigate the known deposits, and to publish all information that can be obtained relating to them and to their manufacture. Samples from various sources may be seen in the State Museum, with some of the ware, useful and ornamental, of California manufacture. It is to be hoped in the future that more numerous samples, both of the crude clays and their products, will be added to the collection. This material is quite extensively used in building in California, as sewer-pipes, tiles, chimney-tops, fire-brick, and also manufactured into many useful forms. A few analyses have been made, which are given below.

The following is an analysis of clay from a deposit at Lincoln, Placer county:

MECHANICAL ANALYSIS.	
Coarse sand.....	10.53
Fine sand.....	10.79
Combined water.....	10.60
Hygroscopic water.....	1.00
Pure clay.....	07.23
100.00	
CHEMICAL ANALYSIS.	
Silica.....	41.80
Alumina.....	33.73
Combined water.....	0.00
Hygroscopic water.....	1.02
Carbonate of lime.....	2.04
Magnesia.....	1.02
Soda.....	3.46
Sesquioxide of iron.....	2.12
Loss.....	2.66
100.00	

The above sample is known to the potters as "white non-plastic clay."

The following is an analysis of a sample of clay from the same locality, known as "blue plastic clay":

MECHANICAL ANALYSIS.	
Coarse sand.....	3.30
Fine sand.....	23.52
Combined water.....	10.30
Hygroscopic water.....	.80
Pure clay.....	50.58
100.00	
CHEMICAL ANALYSIS.	
Silica.....	44.82
Alumina.....	34.64
Combined water.....	8.37
Hygroscopic water.....	1.27
Carbonate of lime.....	3.00
Magnesia.....	.99
Soda.....	4.74
Sesquioxide of iron.....	1.80
Loss.....	.44
100.00	

The following is a mechanical analysis of clay from Cook's ranch, near Lincoln, Placer county:

Coarse sand.....	5.30
Fine sand.....	3.77
Hygroscopic water.....	4.70
Pure clay.....	80.23
100.00	

This clay was almost free from iron, and was very plastic and tenacious; it had a strong argillaceous smell, and when baked was very refractory. The sand washed out was nearly pure silica, which for coarse ware or for fireproof material is not objectionable.

## The Aborigines of Arizona.

Now that the Territory of Arizona is coming into prominence as a field of agricultural and mining industries, being pierced by a railway and populated by many immigrants, it is timely to recur for a moment to the people who are being supplanted, and whose wild life is daily being curbed and checked. One of the Indian tribes inhabiting Arizona is the Apaches, known everywhere as among the worst, the most treacherous and relentless of the Indian race. Their raids have brought grief to many travelers or settlers in their domain, and their bad name has been spoken with execration in many quiet neighborhoods at the East, as their murders have robbed peaceful firesides of those who have gone out on ventures or in the service of the country.

Our engravings show typical forms of the Apache Indians, as secured by Mr. E. Conklin for his "Picturesque Arizona." The Apaches are of medium size, physically quick and active, and are capable of enduring great hardships. Their muscles of locomotion have been developed to the fullest extent, and they are capable of running with great rapidity. Intellectually, they are very shrewd. Since the Apaches have been brought on the reservation they have undergone a great change, and appear like different people.

LOOSE PULLEYS.—Loose pulleys require constant attention and much oil, and are very hard on the belt. It is best to have them a trifle smaller than the tight pulley, and with a step or flange running up to the diameter of the tight one. This takes the strain off the belt and the friction from the pulleys.



## Idaho Territory and Its Resources.

[From our Special Traveling Correspondent.]

Idaho is one of the least known, and yet one of the richest and most attractive of our Territories. It was organized in 1862, and contains an area of over 58,000,000 acres, situated between latitude 42° and 49° north, and longitude 34° and 40° west. It is bounded on the south by Utah and Nevada, west by Oregon and Washington, north by British Columbia, and east by Montana and Wyoming. The greatest length is 485 miles, and smallest width about 50 miles. It is divided into fifteen counties—Ada, Alturas, Bear Lake, Boise, Cassia, Custer, Idaho, Kootenai, Lahtoh, Lemhi, Nez Perce, Oneida, Owyhee, Shoshone and Washington. Governor Caley Lyon, of Lyonsdale, referred to it as "a land of Italian emmure and Syrian winters;" but a noted traveler who once happened to visit it late in the year took exception to this flight of fancy, and thought that although her emmure may outshine Arah the Blest, he should have said Siberian winters.

Now, I cannot coincide in either of these opinions, and have my captious objection on actual experience derived during a residence of several years in the mountain regions of this Territory. The climate of Idaho is generally equable and balmy in summer, with deep snow in the mountains and heavy rains in the valleys during the winter months; mercury rarely falls to 10° below zero in the most elevated mining camps; and cattle, sheep and horses roam over the extensive stock ranges without shelter or prepared feed the year round.

The elevation of the Territory varies from 2,000 ft. in the lower Snake River valley to 10,000 in the Saw-Tooth mountains. The general character of the surface is exceedingly mountainous and rugged. Snow-capped peaks may be seen at all points of the compass. Below, there are rolling hills and benches, which afford excellent pasturage during summer months; and still lower down are measureless plains, mostly covered with sagebrush. As a rule, all the valleys have an inexhaustible soil, in which cereals, vegetables and fruits grow and ripen without more care than that which is bestowed on them in California; but the most extensive one of them all has scarcely yet been touched by the plow or harrow, and therefore, has all the appearance of being a vast desert. I refer to the Snake River valley, which derives its name from that dim and crooked artery of the great desert's heart, and extends through the entire breadth of this Territory.

The smaller valleys, such as Boise, Weiser, Payette, Clearwater, Raft, etc., are also watered by magnificent streams, and most of them are already dotted by pleasant farms. Still, there is plenty of fertile government land left for those who desire to avail themselves of the Homestead Act, and many emigrants who have passed through this country on their way to Oregon and Washington in search of new homes, are now returning to settle among green-clad hills of the "gem of the mountains."

The Shoshone, or Great Falls of Snake river, called by the Indians Pah-chu-lak-a, signifying gift of the Great Spirit, are equaled only by Niagara, and the river has many other picturesque falls within 40 miles of these. Hundreds of springs also gush forth from the basaltic walls, and lashed into silver spray they leap down into the stream below. These natural curiosities are supposed to be the resurrection and new life of rivers that have died and been buried in the desert many miles away.

The country also abounds in hot springs, mountain lakes, ice caves and salt deposits, but its great wealth is in the gold and silver mines, discovered and undiscovered. A satirical tourist once remarked that the Rocky mountains, Sierras and intervening country, must be infinitely rich in minerals, because it is worthless for anything else. Without attempting to refute the latter part of the assertion, I shall send you with this a description of a few of the most noted mining districts of the Territory, and start in with the one in which I am at present holding forth—Wood River. [This letter will be found in another column.—EDS. PRESS.]

A. L. M.

LAUREL HALL.—The closing exercises of this well-known institution for the year 1881 show the esteem in which it is held and the extent of its patronage. The past year was very gratifying to the friends of the institution, and the ensuing term, if the expectations of the Principal are fulfilled, will be even more successful. The rising fortunes of Laurel Hall are a source of pleasure to all who are acquainted with the untiring efforts of Mrs. Buckmaster, and her creditable history as an instructor in this State. The announcement of the coming term may be found in a card in another column.

"THE BOOK OF THE SWORD" is the unique title of a work which has been in progress for many years, by Capt. Richard Barton. It is now fast advancing toward completion. The history of the sword is the history of man, and the author begins with the beginning—with the sword of wood. The work will be properly illustrated.

MINING men from New York inform us that moneyed men are now willing to put their capital into good properties for the purposes of development. They won't look at wild-cats.

## Geological and Botanical Collections.

EDITORS PRESS:—Is there a place in this State where specimens, botanical and geological, ancient and existent, are classified, while the sender holds a numbered duplicate? If not, in the interest of the pupils of our schools, I wish some such an office was instituted.

Could not a "Teacher's Scientific Club" be organized, for the benefit of our instructors and pupils from Siskiyou to San Diego, until specimens are gathered from every one of its 139,000 square miles of territory—a room has found furnished with long, high, deep rows of shelves divided into sections, each representing a county, containing specimens of all its various soils properly analyzed and labeled, and cases of drawers in the center of the room for fossils, etc., and a paper interested in the cause of education devote a column to the proceedings of the "club," and a capable, enthusiastic professor of geology and botany, who will also act as curator in charge, to classify and report upon the collections as they are forwarded.

If such a "club" or office as the one described is already established in this State, all I have to say is, it is not efficiently advertised.

Are our children to grow up in ignorance of the rocks beneath their feet and the plants they see every day of their lives? We use Younman's botany and Gray's in many of our schools, and read various works on geology, entomology, etc., but none of them treat particularly of our own indigenous flora and fauna, and the works of the "Geological Survey," which bear directly on this subject, are out of the reach, in a pecuniary sense, of the masses we instruct in order to "elevate the top." "The Geology," Vol. 1st, (Vol. 2d and 3d, when completed), "Ornithology," "Manual of Flowering Plants and Ferns of California," should be deemed necessary and obligatory possessions of all our school libraries by our directors.

I should not like to know how many country teachers and their pupils in this State are acquainted with the proper analysis and classification of the weeds they daily tramp upon—our manzanita, laurel, Sequoia, chapparal, madrone, plants medicinal and ornamental; fossils, triassic, jurassic, cretaceous and tertiary deposits—for a knowledge of such statistics would be painful.

I wish to have some specimens examined, and am obliged to send them East. It is superfluous, also, to add that such a "club" would encourage original research, stimulate individuality, etc. Maybe among our pupils there would be Hugh Millers, Sedgwicks, Danas, if they had a wider environment. Will you not use your influence in introducing this subject among teachers and others.

MRS. MARY J. GATES.

Point Arena, Cal.

We publish the above not only to show that there is an interest prevailing on the subject to which it refers, but also to inform those interested that there are places where specimens are identified.

In the first place, as to the geological specimens: If they are sent to the University of California, the instructor of mineralogy will always be pleased to identify specimens, as far as can be done by comparison with the standard collection they have there. If it is anything new analysis will be made.

We have also in this city a State Mining Bureau at 313 Pine St., where there is a very fine and extensive collection of minerals, ores, and rocks of all kinds. Mr. Henry G. Hanks, the State Mineralogist, is one of the best off-hand identifiers in the country, and having a fine collection for comparison, can always determine a specimen. If it is new, he will have the State Chemist analyze it. Mr. Hanks is also collecting a fine technical library. Any information in his line he will cheerfully impart.

Then again, if a specimen is sent to the California Academy of Sciences, Mr. C. D. Gibbs, the Curator of Mineralogy, will always be pleased to have it identified.

As to botanical specimens, Dr. A. Kellogg, Curator of Botany of the California Academy of Sciences, will always cheerfully identify them. He has had large experience of California flora, and there is a very large collection of plants all identified, poisoned and labeled in the Academy Museum. This collection is very complete and full, and is the result of many years labor of intelligent collectors.

Of course people asking questions about specimens should send return envelope and stamp, and give full particulars.

THE AVA SUPAIS.—North of Prescott and in the Supai country, exists a fine mineral belt which must be utilized and become the property of the white man. The country is claimed by the Indians, and they expect protection in their rights. They have valuable orchards, good agricultural and grazing lands, all that an Indian desires. It seems to the Arizona Miner that the Government should envy their lands and set apart for their use all lands not mineral, and those containing the precious metal should be declared perfectly free to location by prospectors. Already, numerous parties are developing immense ledges in that country, and immediate action should be taken to insure them against interference on the part of the Ava Supais, who are an independent and quite well behaved people. The mines of Supai are within forty miles of the Atlantic & Pacific railroad, hence must become very valuable.

## Extravagant Prices for Prospects.

Probably there is no other one cause which "keeps back" new mining camps, more than the common custom of charging exorbitant prices for mere prospect holes. After a mine has been developed so as to show there is a lot of ore in sight and there are probabilities of a good deal more, it is all very well to charge high prices; but for mere prospect holes or "mines" with 15 or 20-ft shafts, when men charge \$10,000, \$15,000 or \$20,000 for them, they defeat their own ends. People bear of these things and fight shy of a camp or a country where the custom prevails. When a prospect is near a very rich mine, in a place where there is likely to be great chances of striking rich ore, people will pay a good price for it if only to make a "stock mine" for speculating purposes. But miners, as a general thing, will do better to ask reasonable prices for mines that are in reality only prospects.

Some remarks in this connection from the Nevada Transcript are worthy of note. It says: There are scores of good prospects in Nevada county that are idle to-day, for no other reason than that the owners hold them at extravagant prices. If they would reduce their figures to within reasonable bounds, there are plenty of our own citizens with the money and inclination to invest, if given a fair show, that would take hold and develop them. Under such an order of things it would not be necessary to rely upon capital from abroad coming in. An undeveloped mining claim is a good deal like an undeveloped farm. Much money has to be spent on it before it becomes productive. Before it is sufficiently opened up to yield a sum in excess of the cost of operation it is a dead-weight on the shoulders of the owners. Until the so-called market value of undeveloped deposits of gold-bearing ore and gravel decreases, there cannot be a full-fledged and healthy mining boom in any part of the country. Fancy prices on prospects are responsible for the limited amount of working mines in every camp on the Coast. We hope to see the citizens of Nevada county, than whom there are no more progressive people in the West, soon come to a realizing sense of this fact and act accordingly.

## Arizona's Future.

We take the following from the Arizona Journal: That this Territory is destined ultimately to become one of the most prominent and flourishing States of the Union we think there can be little doubt. Its agricultural advantages, climatic comforts and mineral resources invite and are securing a rapidly increasing population of the better class who will demand admission into the sisterhood of States. Political considerations may defer this consummation for an indefinite period, but its realization, at one time or another, is beyond question. The people who are now flocking to its settlements are, generally, respectable, intelligent, energetic and enterprising. They come here, of course, to make fortunes, but they are not nomadic and make homes as well. They possess efficient capacity to choose their own Governors, Judges, Secretary of State, and all other officers necessary to the proper administration of a well regulated State government.

The climate of the Territory is exceptionally good. We have conversed with a gentleman just from New York who assures us that all along the Eastern coast, especially in the cities, the heat is very much more oppressive than in any portion of Arizona. Then, its mineral wealth is exhaustless; its mountains teem with precious metals inviting capital and enterprise to invest in and develop their immense riches. Labor is remunerative, speculation may be indulged with reasonable assurance of profitable returns, and all branches of business, pursued in a business-like manner, yield an adequate compensation.

It is not, therefore, too much to say that Arizona will very soon be in condition to apply for admission, and claim her right to shine out on the folds of the national flag, a sister State.

YOUNG LADIES' SCHOOL.—The favorably known Young Ladies' School, 1036 Valencia street, S. F., is this year certainly well prepared to do good educational work. The faculty has been enriched by the accession of Rev. Ewd. B. Church, and wife, lately of St. Matthew's Hall, San Mateo, and thus the hands of Miss Cochran, the well known principal of the school are strengthened for the coming year. As the school has three departments—primary, intermediate and academic—it provides for pupils in all stages of advancement; while a full corps of assistants in special studies, enables a young lady to complete her education in any desired line under the most favorable circumstances. For children this school furnishes a thorough training in the rudiments of knowledge and practice, special attention being given to the reading, writing, and speaking of the English language correctly. In no case will other studies be allowed to interfere with these essentials. The advertisement of the institution may be found in another column.

USEFUL FOR WHOOPING COUGH.—The vapor of oil of turpentine is said to be very useful in whooping cough. The oil may be placed on plates in the patient's room.

## Possibilities of Cast Iron.

The term "castiron" suggests, at once, masses of the metal of considerable weight, and whatever the form. We are accustomed to see cast iron in forms difficult to produce by forging processes, and hearing a relation to wrought iron similar to that of the heavy timbers of a building to its joinder work, or the frame of a structure to its attachments.

There is a class of cast iron work that formerly was imported more extensively than now, which gave us minute articles of use, and even ornamental appendages to dress, so light in weight and so apparently fragile in form as to suggest fine hand labor. It was once supposed that we had no material or means to reproduce such diminutive and fragile articles from cast iron. But recent improvements, both in material and manipulation, prove that we can almost equal the delicacy of what is known as "Berlin iron."

Fine charcoal iron possesses wonderful properties of fluidity when in a molten state. It finds its way into the smallest interstices of the mold and comes out cooled, a definite reproduction of the imprint of the pattern. So exact is this reproduction that bare lines, to be represented only by very fine wire in diameter, come from the mold perfect in form and quite tenacious in texture. Articles of cast iron, cast in a mold of sand, which require fifty or a hundred to balance a quarter-pound weight, are as readily produced here as articles weighing pounds, and much more readily than those weighing proportions of tons.

It may be doubted if any metal is capable of producing more diminutive objects than iron. Lead has been used in making filmy ornaments and toys, being cast, while in an almost boiling state, into hard metal molds, which were instantly compressed to expel the superabundant metal; but the same trick is possible with iron, but is not made a business, because films of iron would crumble almost at a touch. Still the iron is there, and is capable of the fluidity of lead, even if it does not possess its tenacity when cold.

As instances of the possibilities of charcoal iron in casting, let anyone examine the delicate shoe buckles and belt buckles, the shawl clasps and ornamental hairpins called steel, which bear a furnished surface rivaling that of silver. He will find that they are of cast iron, very brittle, and showing a bright iron fracture. Millions of these articles are made in this country, and they are cast in sand molds, just the same as masses of iron are cast; and they come out as perfect—more perfect—than the heavier castings.

In short, the possibilities of cast iron range from the utmost capacity of adjoining cupolas, capable of melting 30 tons, to the hand-ladle that with 10 lbs. of metal pours forth a thousand separate articles.—Boston Journal of Commerce.

## The Corrosion of Iron and Steel.

At a meeting of the Iron and Steel Institute, held recently in London, Mr. Parker read a paper on the "Relative Corrosion of Iron and Steel," which we copy from Engineering. Mr. Parker gave a description of tests which he made on discs, 4½ inches in diameter, by ¼ inch thick, of iron and steel plates of various makes and qualities. Seven varieties of iron and four of steel were experimented on, 12 discs from each brand being used, of which six were turned right all over, and six only turned at the edges, the scale being kept as intact as possible. They were accurately weighed and divided into six series, each containing 22 discs, and they were strung together on a rod covered with a glass tube, glass ferrules being also placed between each disc to prevent contact, and thus insure the absence of any galvanic action due to contact.

One series was hung up on the roof of a London building, a second was placed under water at the Brighton pier, a third was fastened under the engine-room floor of a vessel trading to the East, so as to be continuously exposed to the action of the bilge water; and the remaining three sets were hung about 12 inches below the water level in marine boilers of vessels, the two first of which traded to India (one having zinc used in her boilers), while the third vessel ran between London and Newcastle. On the completion of the trials, the discs were carefully cleaned by scraping and brushing, and were reweighed, the results being tabulated, from which it appeared that the corrosion of the steel is but very slightly greater than that of the iron. The author concluded by stating that he did not consider undue importance should be attached to any experiments of the kind made on a small scale, and that the most they could be expected to do was to indicate tendencies, and perhaps suggest remedies and precautions earlier than actual experience, which would take some years to accumulate.—Boston Journal of Commerce.

GLOBULAR LIGHTNING.—M. Treclat has described a remarkable phenomenon, of the nature of globular lightning, observed by him during a thunderstorm last August. A very bright ball, somewhat elongated, passed out of a dark cloud and into it at another place; but, just before disappearing, it gave off a little of its substance, which fell vertically, like a body having weight. The falling body, which left a luminous track, divided, and was extinguished a little above the tops of the houses.



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## Arizona Agriculture.

(Written for the Press)

EDITORS PRESS:—"I do remember my faults this day," as Pharaoh's butler said when the king's dream could not be interpreted. He had promised to remember Joseph to do him a good turn, "but forgot him," and that for two years. It has been nearly two years since I have written anything for the Press, though I have not forgotten it meantime. For, although your paper might not be supposed to have the same interest for me as when I owned lands in California, its weekly visits give me great interest still. I think such a paper grows on one. It seems like an old friend one does not wish to lose.

The mines here, some of them very rich, are continually written up; so my duty will be to report of agricultural matters.

## Climate.

Which is not in every respect the pleasantest in the world all this year round. There are four or five months of quite warm weather. This is rather dreaded by most people, but to me it is not very unpleasant, as there is no sultriness about it, and indoors in daytime and outdoors at night, I rather enjoy it.

Last year, at Tucson, I found my pretty warm; June hot, with remarkable electric phenomena. Leaving my cot with the clothing on it in the sun by day, on first moving the clothing on going to bed in the dark, a faint but distinct sparkling would be seen all over the sheets. Horses, dogs and cats sparkle on stroking them with the hand, as though they were ready to take fire. It seems as though the earth on becoming dry is filled with electricity, which is not able to become equalized till in July, when the rains come. Then there is more lightning and thunder in a small rain cloud than anywhere in the world, perhaps. I never saw such grand and peculiar display of lightning anywhere in the Eastern States, or even on the west coast of Africa. There are not many so-called accidents by it. One man in Tucson was killed year before last.

But the most of July last year, was exceedingly pleasant; cloudy and only moderately warm, so that riding was exquisite, and even working in the fields was delightful.

The rains cease mostly in August, when, as the sun blazes down again, it is hot, particularly when exposed. In the latter part of September the nights begin to get cool, and by the last of October there is, some years, frost. It is frosty some in November; more so in December, so that some nights ice forms an inch thick. The present winter we have not had a speck of snow, but a year ago there fell, on the night of the 29th of January, seven inches of snow—a very rare occurrence here—so that next morning it was considered fun for the ladies and gentlemen to snowball and wash each other's faces at a round rats. It is generally warm by day, so that snow soon leaves, except on the higher mountains. The present winter we have had two pretty fair thunder showers and a sprinkle or two besides, which laid the dust.

## Agriculture.

The trouble is, there is not half enough rain to produce crops. None can be raised without irrigation. Even with irrigation it takes great care and watchfulness to preserve crops through the hot weather. Secondly, soil and productions.

Around Tucson it is not so good an agricultural country as on Gila and Salt rivers. Good wheat and barley are raised where there is water; but Salt river carries off the palm for vegetables generally. Near Phoenix, nearly everything does well. Fine Irish and sweet potatoes are grown, with melons and fruits, which is not the case here. There are but few localities here where a good watermelon can be found. The difficulty with them arises from multitudes of insects (*aphide*), which settle on the vines (riss out of the ground, I am told), in inconceivable numbers, so that the leaves are consumed. The droppings from them look as though grease had been poured over the soil. Hence the Mexicans give it the name, *Manteque*. This takes place just as the fruit is nearly grown, so that the melon, deprived of the sustenance of the leaves, lies there in the sun, saddens and sickens; and is not fit to eat.

On the rich sandy soil of the San Pedro, the Gila, and especially the Salt river, there seems to be no such trouble. Hence they have delicious watermelons.

The muskmelon is not so troubled, and with good seed very fine ones are raised. But it seems to me to come from genial California, very difficult to raise anything here. Possibly one may get skillful enough to meet all difficulties after a time, but it has often worried people out in trying.

In this vicinity, just as grapes and peaches come to ripening, thousands of large, green bugs, of the beetle kind arrive, and proceed as though the whole crop was grown for them exclusively, and I really believe they would swallow down 100 acres of grapes inside of a month if let alone. I judge thus from the manner they attack a half acre of them. People, therefore, have not attempted here to raise any large sized vineyards, for the only way to save the grapes is to tie a paper bag over each bunch. Then, it is true, the grapes become delicious, and very early too, so that the crop is

gone before California grapes begin to come in. They sell readily at 25 cents a pound.

It is not so bad with peaches, though they eat many of them. If peaches here could be early enough to be ripe before the bugs come, or ripen after the bugs are gone, there would be "big" money in peaches. If I could make up my mind to settle permanently here, I would plant the early and late varieties, with the apricot, which it seems now will sell for years at a high price, from 25 cents a pound down to 10 cents. If one could raise half enough to supply the market of Tucson alone, he would have a fortune if he could get only what the freight charges would be on fruit from California. And peaches and apricots grow and bear well here. I have eaten as fine peaches from the tree here, as I ever tasted, I think.

There is sometimes a difficulty, by the fruit being killed; the weather becoming so warm, (as it was this year), in February or March, that the leaves and blossoms are forced out, and then if late frosts follow the fruit is cut off. Apples and peaches do not seem to thrive. It may be that plums and cherries may bear. This will soon be tested. But I must defer till next time.

H. H. MESSENGER,

Tucson, Arizona.

## To Regulate Chloridizing Roasting of Ore.

The main points which have to be considered at a chloridizing roasting are: The time of roasting, the temperature, the amount of salt and the loss of silver, all with reference to the percentage of chloride of silver. The first thing necessary to know, is the amount of silver contained in the ore—for this purpose a reliable average sample must be taken, including this salt if already mixed; this sample to be No. 1. It must be taken either while it is charged in the furnace, or at the battery every 10 or 15 minutes while it drops from the sieves. The roasting should be carried on at a moderate heat. After three or four hours, when the ore assumes a woolly condition, other samples are taken from different parts of the furnace, mixed together, and the assay sample therefrom marked No. 2. One hour later a third sample is taken, No. 3; half an hour after this, No. 4, and before the discharge, or during the discharge, No. 5. The temperature of the last hour should be a moderate light red heat. In case there is a double or treble hearth furnace, one sample more should be taken from the hearth next to the finishing hearth, just before moving the charge over to the finishing hearth, but as there are three charges on three hearths, the samples have to be taken of one charge as it progresses from one hearth to the other.

While the next charge is treated in the same way, but a higher heat applied, the samples already taken must be assayed. In order to find the progress of chlorination, the assay of No. 1 is not needed, it serves only to ascertain the loss of silver during the roasting. One assay of No. 1, however, would not be sufficient, because the weight of the ore changes. For instance, the iron sulphuret (pyrites) loses its sulphur, which is replaced by the lighter oxygen, and weighs then 33% less, but in taking up chlorine, in place of the oxygen, it gets much heavier than it was when a sulphuret, gaining 35%, but a great deal of the chloride of iron volatilizes. For this reason two assays of No. 1 are weighed out, one to be assayed in the usual way, to find out the amount of silver per ton, and the other half ounce is subjected to roasting under the muffle, in a roasting cup for one hour and a half or two, at about the same heat as in the furnace, then weighed out and noted how many grains were lost or gained, as compared with the original 240 grains.

The other samples are assayed to ascertain how much of the silver was chloridized. If, then, all the assay samples showed a progress in chlorination, so that No. 5 was the highest, but still not satisfactory, it indicates that either the time was too short, or the heat too low, or perhaps not enough salt; these assays show also the relative loss of silver.

While these assays were made, the next charge, as before mentioned, was to be conducted at a somewhat increased heat, and samples taken as before. If now, for instance, the last two samples should show the same percentage of chlorination, it were evident that the roasting was carried on too long. In case the chlorination were still too low, and the last one the highest, then the roasting should be tried one hour longer—eventually more heat or more salt, but always controlled by assays. Such investigation may take two or three days, or more.

To ascertain the loss of silver, an average sample is taken when the roasting is finished, and for an assay, weigh out, not half an ounce, but so many grains as there were found after roasting of No. 1 under the muffle, and this weight considered as half an ounce. If then, for instance, the first assay of No. 1 should give 83 ozs. per ton, and that of the roasted ore 73, that is 5 ozs. less, the loss of silver by roasting would be  $\frac{5 \times 100}{83} = 6\%$ .

The loss can be considerably diminished by a proper arrangement of sufficient dust chambers, in which also the volatile metals could be condensed.—*Kustel's Roasting of Gold and Silver Ores.*

"ARE sisters Sally and Nancy resources, pa?" "No, my boy; why do you ask that question?" "Because I heard Uncle Joe say that if you would only husband your resources, you would get along a great deal better than you do. That's all, pa."

## Sinaloa and Durango.

Under the auspices of some of Boston's prominent bankers and business men, for the purpose of development of Mexico and securing the profitable advantages offered by the Mexican government in her concessions for the securing of the construction of lines of railway and telegraph, the Sinaloa and Durango Railroad Company, (Limited), has been organized under the general railroad act of Massachusetts, of which Mr. Thomas N. Hart is president, and Mr. S. W. Richardson, of the banking firm of Richardson, Hill & Company, is treasurer. The company, having secured one of the most valuable concessions made by the Mexican government, are now receiving subscriptions; and in the proposal an opportunity for investment is given which is not often offered upon such advantageous terms. For \$2,700 cash, payable as the same may be assessed by the board of directors, but not more than 20% in any one month, the company will deliver to the subscribers twenty shares of the capital stock at par, \$1,000 in income bonds and \$3,000 in first mortgage bonds. Subscriptions may be made in sums of \$2,700 or in multiples thereof. This company has secured the concession from the Federal government of the republic of Mexico, celebrated August 16, 1880, between Manuel Fernandez, Chief Clerk of the Department of Public Works, representing the executive of this Union, and Senator Mariano Martinez de Castro, representing the government of the State of Sinaloa, authorizing the construction of a railroad and telegraph line in that State, between the Pacific seaport of Altata and the city of Culican, with the privilege of extension into the State of Durango, to reach the city of the same name, or to any other point in the State where it can connect with the line of inter-oceanic or national railway which is to pass through that place. Under the grant and among the concessions to the company are exemption from all taxes and imposts, for a period of 20 years, on its property, including the capital employed in the construction of the road; exemption from all duties on all materials necessary for the construction and operation of the railroad, including locomotives and rolling stock, and for the necessary repairs of the same, for a period of 20 years; the right of way, 70 meters—278 ft.—in width, the entire length of the railway; the public domain, which the line may occupy in the extension fixed, and the lines necessary for stations, warehouses and other buildings, as well as for the water stations and other indispensable accessories of the road and its appurtenances, if the property of the nation shall be given without compensation; the ore beds, also those of coal and salt. The marble and other mineral deposits encountered in the works and excavations made upon the line of the road and its branches, shall be the property of the company, without prejudice to the rights of others, provided it claims and works them subject in all respects to the mining laws, and also a subsidy of \$9,000 per kilometer, or at the rate of \$14,484 per mile, to be paid to the company by the general federal treasury. The estimated cost of constructing this railroad and telegraphic line from Altata to Culican, a distance of 40 miles, is \$500,000, and to either Corsala or Tamazula, as the surveys may determine, 40 miles further, \$500,000 more. The area of the State of Sinaloa is 185,200 square leagues, and its population 162,587, equal to 31 inhabitants to each square league. This State, according to existing political division, contains the capital, Culican, which is the seat of the Legislature, the Supreme Court, the Governor and the Federal authorities. It has nine districts, in the principal towns of which there are political prefects, 31 municipalities, 91 villages, 515 hamlets, four cities and nine towns. There are 114 mining districts, with 400 opened mines of silver, gold, copper and lead; 50 reduction works and 9 deposits of salt; 1,229 haciendas, cattle ranches and cultivated farms. The States of Sinaloa and Durango are now producing between \$4,000,000 and \$5,000,000 of gold and silver per annum, and the production is now on the increase. The American processes of reduction are almost exclusively in use, the mills being built in San Francisco. As a considerable part of the ore mined is rich, large quantities are carried on mule back to the coast and shipped to European ports in a raw state and also as concentrations.—*Economist.*

MINE MANAGEMENT.—John O. Earl has commenced an action against Edwin R. Burke and others, to compel an accounting of moneys received by defendants from the Sumner Gold and Silver Mine, and from the property of the corporation managing it, and the payment of a company note for \$20,000, and to obtain an injunction restraining defendants from disposing of 60,000 shares of pledged stock, given as security for the note. Judge Wilson has ordered that the injunction issue as prayed for. It is averred that the condition of the mine is known to only a few persons, for the reason that the defendants do not permit strangers to visit it; that the financial condition of the company is very bad. Plaintiff says that he is willing to pay the money found to be due on the pledged stock, and charges that defendants have already sold 59,950 pledged shares within the past two weeks for \$135, and would have sold the 60,000 shares for a like nominal sum had they not been enjoined from so doing.

## Copper in Arizona.

A correspondent of the *Bulletin*, writing recently from Tucson, has the following: The copper interests of the Territory are attracting great attention at present, and good copper mines and prospects are eagerly sought after by our resident capitalists as well as by strangers in our gates. The famous Copper Queen mine of Bisbee, which bears the same relation to copper mines that the Contention mine of Tombstone bears to the silver mines, has paid its fortunate owners, Messrs. W. H. Martin & Co., of San Francisco, the well-known seaway contractors, the handsome dividend of \$100,000 per month for the past four months. A recent careful examination of the mine made by John R. James of Tucson, a recognized authority on copper, shows that \$1,925,000 are in sight, estimating copper at 19 cents per pound. The original cost of this mine was \$30,000. A furnace was erected at a cost of \$11,000, making the total cost of mine and plant fall inside of \$50,000. The success of the Copper Queen has stimulated the development of copper properties in other sections of the Territory, and scarcely a day passes without reports of new strikes and big finds of this most valuable metal. The latest transfer of copper properties was made recently, to Mr. Christopher and other California capitalists, by O. A. Hyatt and others of the Apache, Midas and St. Nicholas mines, lying on the easterly slopes of the Santa Catalina mountains, and situated about 55 miles from Tucson. The mines have an elevation of about 7,500 ft., and the vein lies between limestone and porphyry, the limestone being the overlying formation. The ores are found in the shape of carbonates and sulphurets, the carbonates predominating. The average assays show 30% in copper, and about \$20 in silver per ton. On the Apache location a crosscut has now penetrated this vein for 15 ft. in ore of the above description, and the hanging wall of the vein has not yet been encountered. The ledge has been uncovered on the surface for 60 ft., and has been traced the whole length of the claim, 1,500 ft. Some specimens of copper ore taken from the cut, assay as high as 70%. The Midas and St. Nicholas claims are extensions of the Apache, and show the same characteristics. Charcoal is abundant, and can be furnished for 15 cents per bushel. Water rights have been secured, and the cost of smelting should not exceed \$10 per ton. As 30% copper ore is worth about \$60 per ton, there is a large margin of profit in smelting the ores on the ground. Yellow pine abounds, and this variety of timber makes the best charcoal known to the smelter. The climate is good all the year round. A good road can be constructed from the railroad tracks to the mines at an expense not to exceed \$3,000. The ores are free smelting, and there seems to be no reason why the successes of Bisbee should not be repeated at an early day in the Santa Catalinas.

There seems to be a disposition in some quarters to discourage copper mining in Arizona and mysterious hints are thrown out and circulated here in Tucson by certain Boston gentlemen to the effect, that the Calumet and Hecla mines of the Lake Superior region can produce enough copper to supply the demand in the United States. Of course, it is perfectly natural that said company should desire to retain the vast monopoly it has enjoyed for years, and which has enabled it to pay \$18,000,000 in dividends, but the claim of its friends and stockholders that it can supply the American market is preposterous and without foundation. The consumption of copper in the United States amounts to about 25,000 tons per annum, and the consumption is increasing, owing to the new and various uses to which this metal is applied. The Calumet and Hecla produces about 600 tons a month, not one-third of the annual demand. Besides its ores, it averages only three per cent in copper, and has to pass through the process of crushing, concentrating and smelting before ready for market. In our Arizona mines where carbonates abound, the rudest kind of furnace is sufficient to work the ores and convert them into marketable copper. With the construction of the Guaymas railroad our producers will be able to ship from Guaymas direct to foreign ports, and will compete successfully with Chile in supplying the English demands which amounts to about 40,000 tons per annum. The future of the Arizona copper mines is bright and full of promise, and now that avenues of transportation are open by which products can reach tide-water, we ought to be able to under-sell every other copper country.

A BIG RAILROAD SUIT.—The largest railroad suit which ever came before the courts of the United States has just been commenced at Santa Fe, N. M. It is between the Texas-Pacific and Southern Pacific railroads of New Mexico. The suit is brought to recover all that portion of the Southern Pacific built upon the land grant of the Texas-Pacific in New Mexico, which is over a district of country from Sanson river, on the Arizona line, to within four miles of El Paso, a tract of 130 miles. A temporary injunction has been granted, restraining the Southern Pacific of New Mexico from using, occupying or running the road within the limits of land of the Texas-Pacific, or on its right of way in New Mexico, and Judge S. B. Newcomb of Lawrence has been appointed temporary receiver. This suit has been brought since Jay Gould was elected to the Presidency of the Texas-Pacific. This is probably the first shot in a big railroad war.



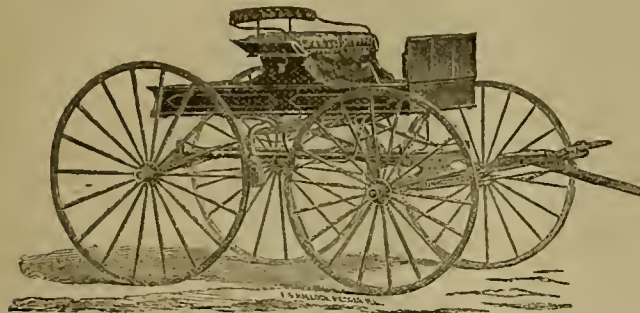
# Descriptive List of Spring Wagons

—MANUFACTURED BY THE—

## SWEEPSTAKE PLOW COMPANY,

COMPRISING AMONG OTHERS THEIR STANDARD MAKE,  
No. 0, No. 00, No. 3 and No. 9,

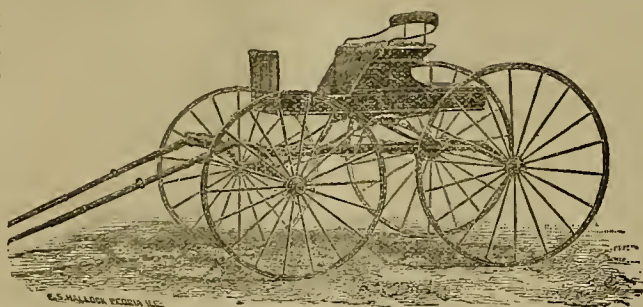
Which they keep in Stock. The increasing demand and popularity of these Wagons, warrants us in calling for them a superiority over all others in the market. They are stylish, easy running, durable and first-class throughout, made by skilled mechanics, using best quality of timber throughout; thoroughly seasoned and standard grade of wheels; all passed through boiling oil and placed in the dry house until ready for use, thereby enabling these Wagons to withstand the hot climate of the interior of our state, and the parching heat of the San Joaquin and other valleys. The iron work is of the best of material. Springs made to order of Swedes steel, Oil Tempered and Warranted. Axles solid collar and faulstaid—made for these wagons only; with patent wrought iron case-hardened boxes, indestructible, and which will not wear out and can not break; the best and most expensive and durable axle box which has ever been brought into use. The painting is neat, not excelled anywhere; and trimmings stylish. In fact the Wagons are all that can be asked for in quality of material, workmanship, general proportions and finish, while their immense sale is convincing proof that they are reasonable in price, and are appreciated by all those who have used them and who believe in the old adage "The Best is the Cheapest."



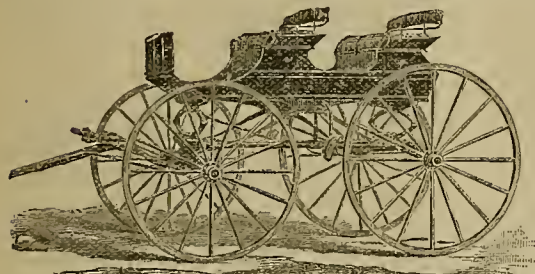
NO. 0.—WITH POLE AND BRAKE

No. 00 is a light Side-Spring Wagon—or Buggy—put up with our Patent Equalizing Rods, which causes the body to set level when unevenly loaded; that is when the load is upon one side, the body will remain level, and not tip sideways, as is common with side springs. It also makes it ride much easier. Its price makes it popular as a Business Wagon as well as a Buggy. It being light, stylish and neatly painted.

Axle, 1-inch.  
Springs, 1½ inch, 4 leaves.



NO. 00.—WITH PATENT EQUALIZING RODS



NO. 1.— WITH POLE AND BRAKE.

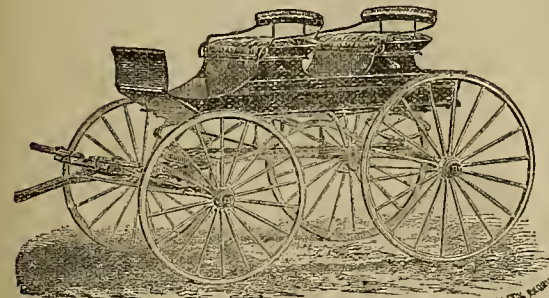
No. 1, with Top, is a popular Family Wagon and Carriage, and is of the same mechanical construction, style and finish as No. 1 without Top. It is a neat standing Top, with drop curtain; is nicely trimmed and handsomely painted. The Top can be quickly removed if desired, and an open Wagon, made of it. It takes the place of a more costly vehicle, and supplies a want long felt for a stylish cheap Carriage.

Axle, 1½ inch.

Springs same size as used on No. 1.



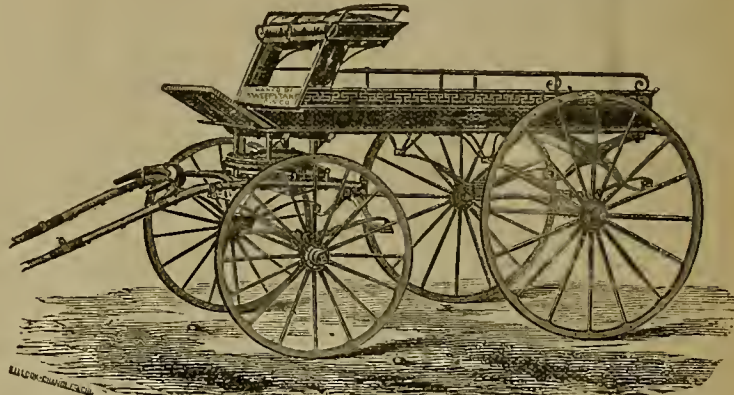
NO. 1.—WITH TOP.



NO. 3.—WITH POLE AND BRAKE.

No. 3 is built very much on the style of our No. 1 Wagon, 4 springs, but has 1½ inch axles and heavier springs; intended for heavy work and loads; has a drop tail board and good length of body, while the seats are easily removed. It is used as a Grocery and Express Wagon; and for farmers who require a Wagon for family use and farm purposes, we can highly recommend it.

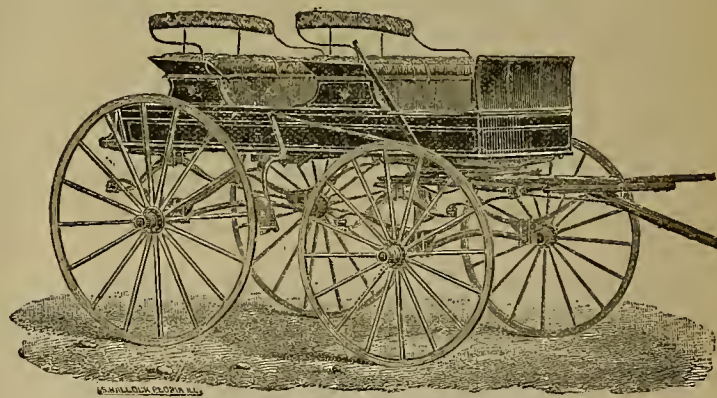
It is also made with Top, as shown in No. 1, or a cheaper Top, if desired.



NO. 4.—PLATFORM GROCERY WAGON.

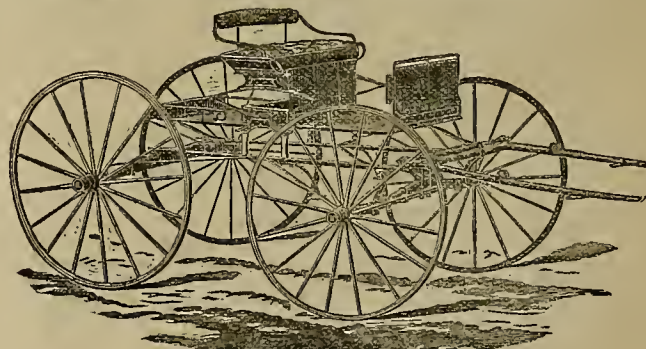
No. 4 is made only to order. Is intended for a Grocery Wagon, and is an elegant and well-made vehicle and well adapted for that purpose.

The wheels turn under the body like those of a hack, thus enabling it to turn in a confined space. It has become very popular; is in every way complete. It has only to be seen to be appreciated. Nothing better in its line can be found.



NO. 7.—PLATFORM SPRING WAGON.

No. 7, Platform Spring Wagon, as shown in cut, is designed for Farmers, Hucksters and Fruit Growers, and for a Light Passenger Wagon. Having six long springs, they give an ease of motion to the body, while the bearings are near the hub, instead of the center. The wagon is well adapted for pleasure riding, and carrying small fruits over rough roads, and for general use is the best and most desirable Spring Wagon which we make. There is no woodwork to the gear, no reaches to break, and they are destined to become the most popular Spring Wagon on this coast for general use. We guarantee those Wagons to be all that we claim for them, and invite the particular attention of our patrons to our Platform Wagon. It is perfect in mechanical construction, unlike many imported from the East, which have proved a failure. They are made with axles from 1½ to any size required. Our popular size, shown in cut, 1½ inch axle. At present we manufacture No. 7 only on direct orders.



NO. 9.—HILL'S PATENT BUCKBOARD.

With a combination of Steel and Wood Springs, is stylish, light and easy running; nice for business or pleasure. The Hill's Patent Buckboard is rapidly coming into favor on account of its combining all the essential points required in style, shape and workmanship. The flexibility of the Steel Springs, combined with that of the wooden side bars, secures an ease in motion not heretofore attained in Buckboards.

No. 10 is a 4 Spring Grocery and light Business Wagon, 1½ inch Axle, Shafts, Brake and one Seat. We make the seat on direct orders, either movable or stationary, foot board, no dash. It has the same running Gear as shown in cut of our No. 1 Wagon, and is adapted for all kinds of light work, and can be used with two seats when desired.

No. 11 is 1½ inch axle, Thoroughbrace, 2-seat canvas trimmed, with canvas top—same style of body as No. Wagon. No material difference except in trimming and Thoroughbraces. Can be used with one seat. We build them for the Arizona trade. They make a fine Express or Road Wagon, etc. Suitable for Tourists and Surveying Parties. Have some now under way.

This Company will also build to order Spring and Thoroughbrace Wagons of any description desired. Send for Catalogue and Price List. Address Agents, BAKER & HAMILTON, San Francisco and Sacramento, or Manufacturer at San Leandro, until July 15, 1881, after which at BENICIA, SOLANO CO., CAL., as it is proposed to Change the location of the Company's Works to Benicia in July next.



### The Wood River Mines.

[From our Special Traveling Correspondent.]

The first mine discovered in the Wood River country was the Big Camas mine, located by M. H. Williams, W. H. Spencer, David Whitmer and Ross Smith, in the fall of 1864. This mine is situated about nine miles due west of the present town of Bellevue, and, unlike most of the more recent discoveries, carries free gold and silver. Work on it was begun in 1865, and was continued for about 18 months, during which time a tunnel, 274 ft. in length, was run to tap the ledge. This was accomplished at a depth of 130 ft. below the surface, and developed a solid ore body, 18 ft. wide, assaying throughout \$25 gold and from 6 to 15 ozs. in silver. The ledge proved to be a true fissure, with well defined walls, but, owing to the distance from the inhabited parts of the country, and the great expense of labor and material in those early days, nothing beyond representative work has ever been done in the mine since that time. The last few years having wrought a great change in this section, and made what was formerly an isolated hunting ground for marauding redskins the most thickly populated part of the Territory, the Big Camas mine is destined to become one of the best paying properties in Idaho, as soon as it is taken hold of and fairly opened by men with sufficient means to prosecute the work. There is a natural wagon road up to the mine from the old emigrant road, which can be reached in less than three miles, and sufficient water power to run an 80-stamp mill during the entire year.

The next locations made on Lower Wood river were in August, 1873, when the Keystone and Galena were discovered by John Callahan and Cyrus Hedges. These were high grade galena and carbonate ledges, from 2 to 2½ ft. wide, and assaying about 200 ozs. silver and 40 to 60% lead. On each of them are 25-ft. shafts, out of which considerable ore has been extracted. These two are the pioneer galena discoveries in what is now proving to be the greatest mineral belt on the western slope of the Rocky mountains.

During the month following

#### Several Locations were Made

In the vicinity of these mines, among them the Antelope and Phoenix, located by Matthew Graham, W. H. Spencer and M. H. Williams. But from this time until the fall of 1876, very little attention was paid to Wood River, and only a few new discoveries were placed on record, except on the East fork, which empties into the main stream about four miles below the present town of Ketchum. Then, some locations were made in 1875, by James Wrencher and Isaac Bryan, which have proved to be very valuable. The principal discoveries made by them were the Paymaster and Silver Tide, from which considerable ore was shipped during last season.

#### In the Summer of 1877

The Nez Perce Indians put on the war paint, and the year following came the Bennock war, which prevented anyone from entering this isolated section. Big Camas prairie had always been the

#### Favorite Home of these Tribes,

And its close proximity to the mines rendered prospecting anything but desirable. Thus, the further development of this country was retarded for two years more, but 1879 found the Indians routed and a new era of activity at once began. This was stimulated by the great influx of miners to the Yankee Fork and Salmon River regions, who after prospecting in that country soon found their way down to Wood River. During that year a number of valuable locations were made in this section, notably the Queen of the Hill, discovered by Frank Jacobs; Mammoth, by Matt. Williams & Co.; Oswego, by Isaac Lee; Star, by Zach. Hayes; Julia and Scorpion by Ben Kennedy *et al*; Black Bear, by the Kelley Bros., etc.

During the winter of 1879-80 some miners and one family wintered on

#### Wood River, for the First Time

Since the country's discovery, with the exception of one winter, that of 1865-66, when M. H. Williams and two others ran their tunnel on the Big Camas mine. In the spring of 1880 a big rush began from all quarters, and it is estimated that 3,000 men scoured the mountains, hillsides, canyons and gulches, as if "in search of that which was lost." During that year C. P. Croy discovered the Bullion; A. P. Turner and Thomas Edgington, the Idahoan; Geo and Thos. Edgington, the Mayflower, and Lewis Bros, the Jay Gould. Among other valuable locations made that season may be mentioned the Town View, Monday, Minnie Moore, Climax, Elk Horn, North Star, Penobscot, Relief, Hard Times, Ornament, Meyer's, Chicago, Iris, Garfield, Rippetoe, Orient, Ophir, Jim Blaine, Ritchie, Greenhorn, Lewis and several hundred more. These locations are all on lower Wood River, south of Warm Springs creek and the East Fork; but nearly, if not fully as many discoveries were made in the vicinity of Galena and Saw Tooth City, as well as on Little Wood River and in the Smoky Creek district, all being within the boundaries of Alturas county. The towns of Bellevue, Ketchum, Galena, Bullion and Saw Tooth City saw their beginning during that season, and about 200 families and 1,000 single men decided to brave the cold and snow of last winter in these places. About the 1st of March, this year,

### A New Emigration

From Utah, Nevada, Oregon, and, in fact, all parts of the Pacific Coast, began to pour in, so that now there are fully 500 families and 10,000 men in the same scope of country. Such a stampede as this has never been witnessed since the balmy days of White Pine. The roads are lined with teams, horses, and men on foot. The stages from Blackfoot and Boise City are loaded to their utmost capacity, while the line from Kelton had to "double up," several weeks ago.

Bellevue, which has heretofore been the principal town, has now found a rival in the promising city of Hailey, situated five miles higher up the river. This place is only seven weeks old, but has already over 200 buildings, which keep increasing at the rate of ten per day. There is a great race for supremacy between the

#### Two Towns,

And considerable jealousy between their inhabitants. This is heightened by the intended change in the location of the county seat, which is now at Rocky Bar. Both places contend for it. Bellevue people refer to Hailey as the "Mushroom City," and the Haileites retaliate by speaking of it as "the place at the mouth of Slaughter House gulch, commonly known as Bung-hole, but designated by the Postoffice Department as Bellevue."

I am not yet prepared to venture an opinion as to which will become the main town, but as far as indications go, Hailey seems to have the advantage in many respects. It is beautifully situated on the east bank of the river, directly opposite Croy's gulch, in which all the best mines have been discovered, and has the natural location for a future city and place of supplies.

A. L. M.

### A Mining Romance.

A year ago an American prospector of the better sort, understanding Spanish thoroughly, while looking over the archives of an old church near Magdalena, Sonora, discovered a manuscript report of a Jesuit priest who traveled over Arizona more than one hundred years ago. The brave missionary, in the cause of Christ and in the interest of Spain, had traversed deserts, forded rivers, crossed mountains and battled with Indians. He was finely educated, particularly in mineralogy and geology. In the course of his travels he discovered rich mines, some of which he developed, and all of which he described. The manuscript describes the Silver King mine, and locates it, giving longitude and latitude exactly. It is said to be a mine richer than any yet discovered, but adds that in Sonora there is a mine as far ahead of Silver King as Silver King is ahead of ordinary mines. The longitude and latitude of this mine is given, and the paper adds that when this mine is developed untold wealth will be dug out, and silver will become a drug in the market.

It is also stated that this mine has been somewhat developed, and that the surface indications were surprising. From an examination of the data, Mr. John J. Carrillo, of Los Angeles, was led to hunt for the mine, and he believes he has found it. He finds an old shaft at the exact locality. Large trees have grown up in it, and the dump is covered with vegetation. Ages have elapsed since the miners have been silenced in death. Unceasing vegetation has in a measure obliterated the work, but it is estimated that 3,000 tons of ore, averaging \$100 to the ton, are on the dump. It would be strange if, in this iconoclastic age, an old Jesuit explorer should have left such a record as to unfold the story of untold wealth in a Sonora bonanza for a Californian to enrich himself with. It is to be hoped the religious enthusiast may have contributed his mite toward enriching the present, and that his science may have done something for the progress of the American Republic.

### Magnetic Separation of Ore.

A Belgian company, who work a zinc mine in Spain, met with ore containing a mixture of calamine and spar iron, which they could not separate by any preliminary treatment. They accordingly applied to Siemens and Halske, the eminent electricians, of Berlin, who devised an appliance capable of separating 20 tons of ore daily. It consists of an inclined steel shaft, fitted with an endless screw of brass, and surrounded by a brass tube open at its upper surface. The tube is mounted inside a hollow cylinder composed of a series of parallel iron disks, separated by brass hoops and connected by iron rods. This constitutes a series of magnets, the annular poles of which form the inside of the cylinder; the magnetism being effected by means of insulated wires rolled round inside the hollow cylinder. It is here that the magnetic particles yield to the attraction of the annular magnets, and are carried, by the rotary motion, to the upper portion of the cylindrical surface, until they meet a baffle plate, which deflects them on to the screw. Falling through the slot on the upper surface of the tube, they are carried along by the revolving endless screw, and pass out into a shoot at the end. The particles which are not magnetic slip along the bottom of the hollow cylinder without being attracted by the magnets, and pass out by a separate shoot.

### The Truth About Arizona.

Arizona, in the opinion of many of the people who derive their information from itinerant bums with neither the means pecuniarily or the ability intellectually to form a correct estimate of its capabilities, is a territory made up of burning suns, arid deserts and inaccessible and inhospitable mountains. They may believe, and probably do, that the mountains are pregnant of gold and silver, iron, copper and other precious metals and ores, but at the same time they cannot be utilized because of the intense heat, the unhealthiness of the climate, scarcity of water, the inaccessibility of the deposits, etc. Now, to those who have resided in the Territory for any length of time and made themselves familiar with its resources, and possibilities, and general condition, climatic and otherwise, all these statements are the sheerest nonsense. Such a one is the editor of the *Journal*, of Tucson, and he says: "Nobody pretends to say that the climate is that of Italy represented by the poets; that its agricultural productions are as luxuriant as those produced in the prolific valley of the Mississippi; that its flora is as beautiful as that of Florida, or its fauna diversified as that of the jungles of Africa give to zoology, or, perhaps, that its mineral wealth is as great as the boasted riches of Ophir and Golconda, but we do pretend to assert and maintain that it is no such repulsive locality as it is represented to be by ignorant and uninformed charlatans. There are mountains, but they are rich and accessible; there are plains, denuded of herbage, but they are susceptible of high cultivation and prolific of vegetable productions; water, though scarce in some sections of the Territory, may be found abundantly in others; the range of the mercury during a few of the summer months may be high, but the heat is not of that oppressive character which prevails in other States and Territories and renders a residence therein at once disagreeable and dangerous. In short, we dare to reiterate that Arizona offers as many inducements for permanent settlement, if not more, than any territory acquired by the United States within the past quarter of a century.

To active enterprise, a vast and profitable field is opened. In mineral wealth it is outstripping the vaunted supremacy of the Comstock, and with the single exception of Colorado, bids fair to lead in the van of silver-producing countries. What it is capable of in an agricultural way remains as yet, of course, an unsolved problem. Other industries have oversleighted agricultural pursuits, and must necessarily continue to do so while the former offer to the speculator and adventurer prospects of a more immediate or prospectively profitable return; but as the Territory increases in population, the want and necessities of the inhabitants increase in proportion until, at length, it will be found that other industries and pursuits than that of mining will afford remunerative returns. Then there will also be found persons who will turn their attention to the soil, and if there be, as we believe there is, vitality in it, we will have gardens, fields, ranches, trees, flowers, and fruits, and flowing waters where now all that meets the eye is desolate and barren.

### Columbus District, Nevada.

The Columbus District mines attract a good deal of attention. The mineral-bearing belt is four miles long and two miles wide. It contains two lines of mines, the first beginning at the north, or rather northwest, and runs in the following order: Northern Belle, Princess, Mount Diablo, General Jackson and New England. The second ledge, about 3,000 ft. to the east of the first, has its mines located with the Victor at the north, and George Washington, Mount Potosi and Enterprise adjacent. There is another shorter ledge, on which is located the Metallic, Equator and Lucky Hill. The Northern Belle was the first mine developed, and securing a mill at Columbus, eight and a half miles away, began to pay dividends immediately. It has now paid over 40 dividends, amounting to \$2,000,000. The Mount Diablo, an equally rich mine, began taking out ore, but was unable to secure a mill, and having no water facilities, could not build one. The proprietors, however, went ahead and developed their property, and now have ore enough in sight to keep a 40-stamp mill running two years. The Victor has 50,000 tons of \$40 rock piled on its dumps, and other mines are similarly situated. There is at least \$6,000,000 in sight in ore, and geologists claim that the district may be counted on for \$60,000,000. Messrs. Clatworthy & Sutherland will bring water from Pinshower canyon, in the White mountains. They will lay pipes 23 miles at an expense of \$100,000, and inside of four months will be able to discharge 300,000 gallons of water each 24 hours, with a fall of 800 ft. As soon as the water reaches the district, the Mount Diablo, Lucky Hill, Victor and George Washington mines will erect mills, and a New York company will erect one for custom rock. The above is from the *Carson Appeal*. We are informed, in addition, that the Lucky Hill is owned by well-known San Francisco capitalists, and the ledge is said to be 60 ft. wide, containing ore that will average from \$30 to \$40 per ton. As soon as the water reaches the district the mills will commence to crush, and a new era of legitimate mining will be inaugurated.

### Gas for Roasting Ore.

At a recent meeting of the American Institute of Mining Engineers, W. J. Taylor, of Chester, N. J., read the following paper "On a fluxing gas producer for making heating gas."

In making heating gas with anthracite coal for roasting ore during the past few years, I have tried many forms of gas generators. So far, the most successful and satisfactory one has been what we call a fluxing producer, which is simply a small cupola or blast furnace, in which we charge with the coal, say, 30 or 40% of basic blast-furnace cinder, to units, when melted, with the ash or earthy matter in the coal, and carry it off as cinder. The producer we have in use at Chester, N. J., has more of the lines of a blast furnace than a cupola, the hearth being 24 inches diameter and 24 inches high. It then enlarges on an angle of about 25° from a perpendicular to 4 ft., and then is drawn into 3 ft. on top; total height, 12 ft. We use one water coil-tuyere 12 inches above the bottom, and blow through a 1½-inch nozzle. The depth of coal above the tuyere averages about 6 ft. The producer is blown with a small Weimer blowing engine 24 inches diameter and 12 inches stroke, delivering 6 cubic ft. of air to a revolution, or 300 ft. of air per minute. It consumes, say, 200 pounds of coal per hour, which is about 80 ft. of air for 1 pound of coal. The air pressure is from 1 pound to 1½ pounds to the square inch. The cinder is tapped out about every two hours, and is black and glassy. In this way we get a continuous flow of gas as long as the engine is kept running. We have run for at least four weeks without a moment's stoppage or change of any kind. We depend upon cinder mainly for fluxing, and though we often use a little limestone with it, we have never tried to do without cinder entirely. The only fuel used so far has been anthracite coal, broken or egg sizes giving the best results. We have not been able to make fine anthracite work at all. I have no doubt that almost any kind of bituminous coal could be used, if not too fine.

The advantages in favor of this producer are: 1st. It makes an excellent gas, very uniform in quality. There is so much incandescent fuel above the tuyere that no air can escape unsummed, and the gas is almost entirely free from carbonic acid.

2d. There is no cleaning of ashes to be done, consequently, there is no cessation of the flow of gas and no waste of coal—a very important matter.

3d. The quantity of gas from this producer can be increased by simply increasing the volume of air entering it, and any one familiar with blast-furnace practice can run it, particularly if cinder for fluxing is available. The power required for blowing the producer for burning 200 pounds of coal per hour is, say, 45,000 foot-pounds, or 1½ horse power, which, at 3 pounds coal per horse-power per hour, would amount to 2½% of the coal burned in the producer.

### Idle Mines and the Cause.

In this rich and unequalled mineral country we have several important mining properties lying dormant, and the question is asked upon every corner of our streets, "Why is this?" The answer as given by the *Arizona Miner*, from which we take this item, is a short one and easily given—"Mismanagement."

On the Sandy was discovered the McCrackin. Here we expected to hear of and live to see another Comstock. A mill was put up, ore hauled and crushed, and, naturally, under bad management, came a grand shut down and failure. Finally a careful man, Mr. Hubbard, takes the property in hand without a dollar, pays a royalty on the ore he works, pays for everything and makes money. He manages with economy and good judgment, hence makes a success.

Next we have the Hackberry mill and mine, pronounced a failure. Why is this? San Francisco parties sent down \$30,000 worth of useless machinery, etc., and the small fry who are owners are closed out, being unable to meet their proportion of the indebtedness, and operations cease.

Then we are asked about the Tiger. Here is another piece of bad management. Seventy-five thousand dollars are expended in opening the mine, when really no opening is made.

The Peck, which has yielded hundreds of thousands of dollars, is about to resume operations. This mine, too, has had its bad management in some respects, and serious drawbacks.

The old Vulture, abandoned for years because it could not pay under a foul, bad management, is now clearing \$20,000 to \$30,000 per month.

The Tiptop company has always had good management, and now has in its treasury some \$300,000.

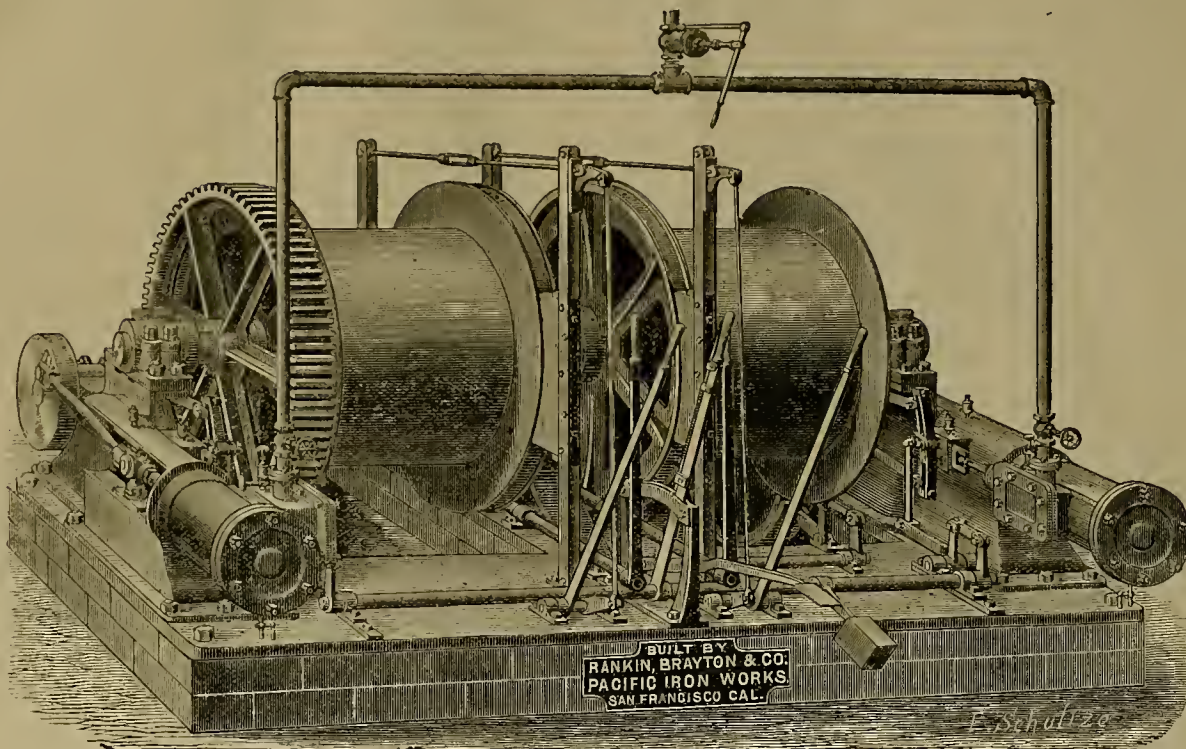
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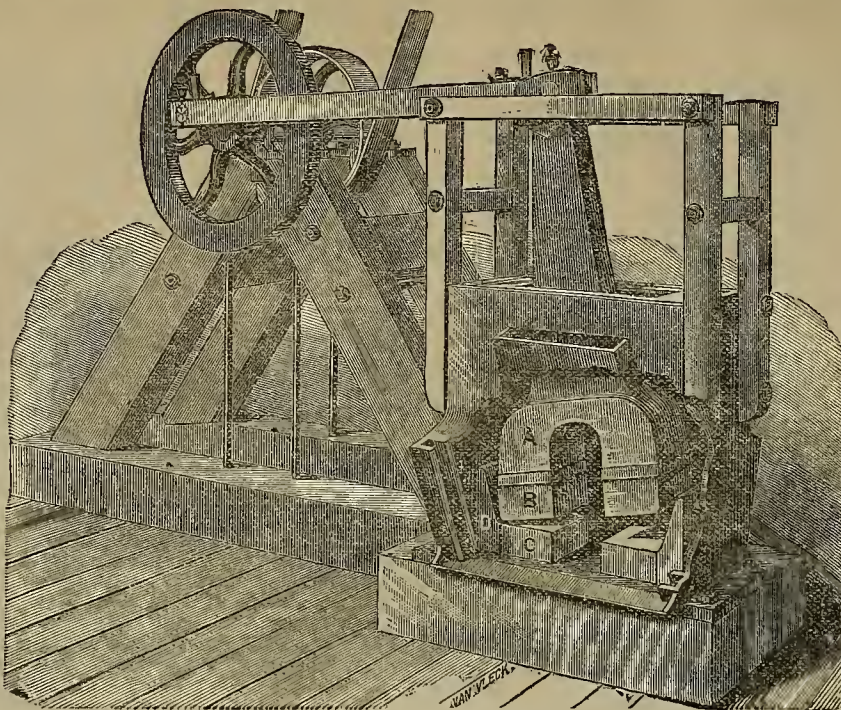
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Twenty Per Cent. More Ore Crushed with Fifteen Per Cent. Less Wear of Iron than by Hand Feeding.

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It is now fully demonstrated, after careful and long continued experimentation and practical use, that the plan upon which a perfect Ore Feeder must be constructed is that of a carrier, and not that of a shaking-table. Uniform and accurate feeding is not possible upon the latter plan. The ore must be evenly carried, upon a steadily advancing plane or table, to the line of discharge, and there simply dropped. Jerky or spasmodic contrivances will not answer the purpose for wet or sticky ores.

The Challenge Ore Feeders are now in use in the following Mills, besides many others:

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Sheep-Ranch.....20 ".....	Calaveras " "
Mahoney.....40 ".....	Amador " "
Zelle.....40 ".....	" " "
Placerville.....40 ".....	El Dorado " "
Gross.....50 ".....	" " "
Julian.....20 ".....	Placer " "
St. Patrick.....15 ".....	" " "
Providence.....20 ".....	Nevada " "
Omaha.....20 ".....	" " "
Green Mountain.....60 ".....	Plumas " "
Plumas Eureka.....60 ".....	" " "
Bulwer-Standard.....30 ".....	Bodie Dis. Mono. " "
Standard.....20 ".....	" " "
Neenaday.....30 ".....	" " "
Bodie.....10 ".....	" " "
Christy.....5 ".....	Utah Co., Utah. " "
Ontario.....40 ".....	Parley's Park, " "
Contention.....20 ".....	Tombstone Dis. Arizona " "
Grand Central.....20 ".....	" " "
Harshaw.....20 ".....	Patagonia, " "
Sunshine.....20 ".....	Idaho Springs, Col. " "
Homestead.....20 ".....	Black Hills, Dakota. " "
Father De Smet.....50 ".....	" " "
Hidden Treasure.....40 ".....	" " "

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At the "Christy" Mill, Utah County, Utah, the "Eclipse" Feeders, (conceived by E. Colman) were introduced, but not carrying a regular supply of ore for the crushing capacity of the stamps, were replaced by the "Challenge" Feeders, which are now running and the stamps crushing forty (40) per cent. more ore than was done by the "Eclipse".

The "Harshaw" or "Hermosa" Mill, of Patagonia District, Arizona, was also originally fitted with "Eclipse" feeders, but after a few weeks' trial they were pronounced adequate to the work, discarded, and the "Challenge" adopted.

The "Silver King" Mill, of Arizona, also removed the "Eclipse" Feeders to give place to the "Challenge".

The "Sole" Mill, of Brown's Valley, Yuba County, Cal., was fitted with "Victor" Feeders, manufactured by E. T. Steen, but proving insufficient, the "Challenge" Feeders were substituted.

Four of the "Victor" Feeders, manufactured by E. T. Steen, were also placed in the "Alexander" Mill, at Grantsville, Nevada, but after a fair trial were discarded, and Hendy's Feeders fitted, and four others of the same pattern added when the second twenty stamps were erected.

These cases are simply cited from among many similar instances, in proof of the vast superiority of the "Challenge" Feeders over all others.

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## The Old River Beds of the Sierra Nevada of California.

The following is an abstract of a paper written by James J. McGillivray, of Oakland, which he has given us permission to publish:

This subject has been thoroughly investigated by Prof. Whitney as State Geologist, and the results of his investigation embodied in a work entitled "Geology of California; a report of Progress and Synopsis of the Field-work from 1860 to 1864," and later, in a work entitled "The Auriferous Gravels of the Sierra Nevada of California," in which he has discussed particularly the phenomena of the old river beds. The writer has drawn much information from Prof. Whitney's writings, and also from no less eminent authority, Prof. Joseph Le Conte, in his lectures in geology, and in articles contributed by the same gentleman. The most noticeable feature in regard to the old river beds is their great elevation above the present rivers. The region in which this phenomenon presents itself is the place to which we direct our attention. Generally speaking, it embraces the auriferous slate belt of middle California, along the western slope of the Sierra, from Tuolumne on the south to Plumas on the north, a distance of about 250 miles, and from the plains on the west to about 5,000 ft. elevation on the Sierra slope in the east. South of this limit there was but a slight lava flow, and hence the rivers have remained unchanged through tertiary times to the present; while north of this limit the lava flow was so extensive as to completely cover up the old beds and intervening ridges to such an extent that they have been lost sight of; and so with the last two localities we are not here concerned.

### The Ridges.

From the summit of the Sierra there extend in a southwesterly direction a number of gently sloping ridges, on an average more than a thousand ft. above the present canyons. On these high ridges, lying unconformably on the slate, is situated the river-washed gravel of the tertiary, varying in thickness from a few ft. to several hundred. Almost all of the gravel of the old river-beds included in the region under consideration is covered to a greater or less extent by volcanic material. To this has been attributed the displacing of the streams from their former channels. To what extent it was this cause of the displacement will be considered further on.

### The Old and New River Systems.

We have, then, in California, two systems of rivers, the old and the new—the drift of the old system occupying the present divides or ridges, and the present rivers occupying the deep intervening canyons. The direction of the old system was generally parallel to the present. This was naturally the case owing to the direction of the slope of the Sierra being the same in the tertiary as at the present time. The only marked exception to the parallelism of the old and new rivers appears between the Middle Yuba and South Feather rivers. Here the trend of the tertiary rivers is pretty clearly shown to have been in a northerly and southerly direction. In this locality the old system has been cut across by the new. In deciding as to the comparative direction of the old and new rivers we are forced to a conclusion by either one of two arguments. In the first place, the old channels speak for themselves as to the direction of the former rivers; and secondly, geologists almost universally agree that the Sierra was pushed up at the end of the jurassic to at least almost its present condition; that the drift of the old system was deposited during pliocene or early quaternary, and consequently the rivers could not possibly have taken any other direction than that of the slope. The change of direction of the rivers between the South Yuba and North Feather may have been due to an elevation in that part of the Sierra, which changed the slope of the country from a northerly and southerly direction to an easterly and westerly direction.

### Different Views of Geologists.

Views as to the direction of the former rivers have been held differing greatly from the one almost universally held by geologists, as stated above. We will mention two; one because held by a prominent geologist, and the other because of its popularity among the miners at one time. Richthofen, in his essay on "The Natural System of the Volcanic Rocks," says that during the period of volcanic activity in that region the crest of the Sierra was raised at a higher rate than its western foot, and that consequently the ancient rivers which were flowing parallel to that crest have been gradually turned from their channels and made to flow in the present direction of the drainage. As there is no evidence, such as fissures would present, of a general uplift sufficient to cause the change of trend of the rivers at such a recent date, and as the channels filled with gravel from the former direction of the rivers, the theory is untenable.

### Blue Lead Theory.

The "blue lead" theory has for a long time been the hobby of the miners. By it they explained the existence of the blue gravel so universally distributed all over the country. The theory held that the gravel of the blue lead was deposited by a great river flowing for hundreds of miles in a southwesterly direction along the

westerly slope of the Sierra. The theory was founded upon the supposed existence of a belt of deep gravel extending across the country in the direction of the supposed river. It has been shown later, however, that there is no well defined belt extending uninterruptedly across the country. It has also been shown that the deep blue gravel which was supposed to be the kind deposited by this stream was not deposited as blue gravel, but that by subsequent chemical action the gravel became blue.

### Deposition of the Gravel.

We will mention two theories as to the deposition of the gravel, in which has been placed considerable credence: One is that the sea covered the country during the time of accumulation. The objections to this are conclusive: First, no marine fossils have ever been found in the gravel; second, the banks of gravel prove fresh water action. Another theory is that the accumulation of gravel was the direct work of glaciers. The fact that no glacial scorings are found in the gravel disproves this. Whitney believes that there were no glaciers nor ice sheet until the present canyons were cut nearly to their present condition.

### An Anomalous Condition.

The condition of things as to the old and new rivers in California is strikingly anomalous. Instead of the present streams cutting into the old river beds, they were displaced by the lava overflow at the end of the pliocene, and forced to cut new channels. So, as a result, we have the present deep canyons and the old beds left in the high intervening ridges. The condition of things in a typical river bed is quite different: 1. There is no old river bed far deeper and broader than the present. 2. This river bed is filled up with river deposit sometimes several hundred feet. 3. Into this deposit the present shrunken stream is cutting a new channel. Many of these typical beds existed in the same place as at present during the cretaceous and up to the present, as in the case of the Mississippi or Connecticut rivers. At the end of the pliocene, the rivers of the Sierra were displaced by lava and made to seek new channels. The present canyons are the result.

### Geological Features.

Having shown the general features in a comparison of the two systems of rivers in California, we will take up in the order of geological sequence the points particularly bearing on the subject. With reference to the early history of the Sierra, we are not here concerned. We will assume that the mountains were already formed, and begin with the accumulation of the auriferous gravels. First, as regards the original location and condition of the gold, and gravel containing it. The region of gravel deposit is a region of auriferous slates. In Mariposa county, as soon as the slates set in, we find quartz ledges, and overlying the metalliferous slate is the gravel deposit containing gold. It was from the ledges contained in this slate that the gold of the washed gravel was removed. The age of the metalliferous slate is jurassic, while that of Australia and the Ural mountains is silurian. We thus see no connection between gold formation in ledges and geological age as formerly believed. Gold formation is owing to metamorphism and accompanying chemical reaction. That veins are formed in the rocks while they are being metamorphosed by heat is agreed on, and believed, by all geologists. In this connection it is well to note what Whitney says in regard to the time of the formation of gold in the veins of the slate from which the gravel and gold was most certainly removed by the action of water. He says:

"The inquiry naturally suggests itself, then, at what epoch did the formation of the quartz veins in the bed-rock take place? Was it contemporaneous with the grand exhibition of volcanic forces which took place in the Sierra during the latter part of the gravel epoch?—and if so, are the phenomena genetically connected? To the writer's mind it seems clear that both these questions can be answered in the affirmative."

Again he says: "The whole series of phenomena observed in the Sierra Nevada gives ample grounds for the belief that the metamorphic rocks of the range—the bed-rock, in short—were the original home of the gold now so generally distributed through the gravel."

The first quotation from Whitney, in regard to the contemporaneous formation of the gold in the veins and the lava overflow, we are not able to understand. The gold at present found in the gravel was certainly not the gold that was found in the veins during the metamorphism, caused by the heat of the impending lava flood, for that the gold and gravel containing it were placed in their position by the action of water, and that the lava flood was subsequent, need no explanation.

### The Accumulation of the Drift.

As soon as the elevation of the Sierra occurred, at the end of the jurassic, the old rivers ran down the slope in a direction parallel to the present rivers. Then began the accumulation of the drift of the old beds. The conditions must have been very favorable under which the gravel was accumulated in such immense quantities. As an example of the extent of the drift, I will mention that of the Forest Hill divide. The gravel there occupies almost the entire divide from the lower limit of gravel to near the summit of the Sierra, a distance of about 25 miles. The width of this belt of gravel varies from 50 yards to several miles. Its depth varies from a few feet to several hun-

dred. The bedrock over the whole area is comparatively even, as we may imagine the whole slope of the Sierra to have been while the gravel was being deposited, so that the streams were not confined so as to carry off their sediment like the streams of the present canyons. As soon as the streams filled their channels they spread out and deposited somewhere else. In so far as the orography of the country was concerned the conditions were extremely favorable for the accumulation of detritus. Three other things enter as elements in forming deposits. 1. The amount of water flowing in the streams. 2. The amount of erosion. 3. The amount of fall in the streams. As these vary irrespective of one another, we cannot state the exact condition of things in respect to them. It has been supposed that the amount of water in the Sierra was greater than at present to cause the amount of accumulation. There probably was, but it was not necessary for the result. Alternations of drought and freshet would have brought about the same result. The size of the boulders argues a greater amount of water necessary to move them to their present position. On the whole, we prefer to believe that there was a greater amount of water in the streams and a greater amount of erosion, so that the overloaded streams were continually overflowing their banks, until a greater part of the whole slope was covered with gravel. It will be impossible to ever tell how extensive the deposit was, as a great deal has been undermined and carried away while the present canyons were being formed. If we judge from the size of the channels, we conclude that the pliocene streams must have been very large. The deep channel at Iowa Hill, as described by Mr. Goodyear, measures across the top, from rim to rim, over 2,000 ft. The depth of this channel is 200 ft.

### Formation of Present Canyons.

The next event in the history of the old rivers was the displacement of the streams from their former beds and the formation of the present canyons. The cause of the displacement was the filling up and protecting of the old river beds by lava ash and lava. The lava eruption took place at the end of the pliocene. Upon and to a certain extent interstratified with the gravel, there exists deposits of volcanic material—some solid, some fragmentary, and others water-worn, showing that the epoch during which igneous agencies were at work was a long one. As soon as the volcanic period passed away and the streams were left to find new courses, the smallest inequalities helped to decide the ultimate course of the streams, so that it often must have happened that the old river beds were cut into and worn away. To what extent the old river beds have become ridges, and the old ridges become quaternary canyons, it is hard to decide. In this connection, we will say that what has been called the "typical form" of the ancient gravel beds, as seen in Tuolumne Table Mountain, is seldom found. It is of rare occurrence to find the old river-bed followed by a lava stream which has acted as a protecting cap. It will be asked to what extent the lava overflow, in its various forms, has acted as a shield against the erosion of the underlying gravel? To a limited extent only do we think it has so acted. At the time far before the lava eruption there was a slight increase in the altitude of the range which assisted in the cutting of new channels, which have in time become the present deep canyons. After the lava overflow the amount of rain erosion may have been less, owing to the character of the material covering the surface of the country. If the rain erosion was less, the river erosion would be greater, and the streams would soon begin the formation of the present canyons in those places which were the lowest at the particular time, and which were the least protected by the superincumbent lava.

### Age of the Gravel.

As to the age of the gravel we can safely say that it belongs to the last part of the tertiary. Forms of the pliocene are by far the most numerous. Quaternary species are just coming in, and so the lava flow may be considered the closing event of the pliocene and the introduction of the quaternary. As to the existence of man or human implements in the sub-lava drift, there has been nothing thoroughly authenticated, although Whitney believes that man did exist while the gravel was being deposited. He has drawn his inferences from the "Calaveras skull" discovery, which, by most geologists is believed either to have been a hoax; or, if not, it even then ought not to have the significance attached to it which Whitney would give it. If man did exist at that time we have a most anomalous case in evolution, namely: The appearance of man before species long since departed. If man did inhabit the world during the pliocene, he has existed through a period during which several species have come into existence, ruled the earth, and passed away.

OBSERVING THE SUN.—In a letter to *La Nature*, M. Cornillon states that when observing the sun lately with a telescope, he was struck with certain undulatory movements on the disk. On inquiry into their cause he is led to connect them with the wind blowing on the earth's surface at the time. They vary in intensity with this, and they have generally, (but not always) the same direction as the wind. Where they have a different direction they indicate a change of weather, or at least the direction of the wind next day.

## Chlorination Tailings.

However carefully the ore may be treated, a certain portion of gold remains in the tailings, varying, other things being equal, according to the character of the ore. In case this results, in part, from the presence of particles too large to be entirely dissolved, that portion can be extracted by re-treatment, either with gas, by chlorine water, or by amalgamation. But a portion, which is sometimes quite considerable, still remains and resists every mode of chlorination or amalgamation, and can only be extracted by smelting with lead.

In general, it may be said that gold which can be seen by the aid of a lens, after finely grinding and carefully washing a sample of the tailings, can be extracted by chlorination or amalgamation; but that which cannot thus be rendered visible can neither be chlorinated nor amalgamated, even if the ore be re-roasted, with or without re-grinding. (If re-ground it forms a pasty mass, which cannot be leached, being almost impervious to water.) Of course the ore is supposed to be properly roasted in the first instance.

Concentrated sulphides containing gold, and free from lead, will frequently yield as much as 95% of the fire assay, if moderately rich, but the extraction of 95% is considered a good result, from ore containing \$100 worth of gold in a ton. As the material loses about 24% of its weight in the roasting and leaching, it will readily be perceived that if there has been no sensible loss of gold in the roasting, the tailings from such ore will assay about \$6 per ton, and for every hundred tons of ore treated there will be 76 tons of tailings, containing \$456 worth of gold.

Tailings of this character, consisting chiefly of iron peroxide, make an excellent flux for the smelting of galena. All the precious metal they contain is extracted, together with the lead set free from the galena by the action of the iron oxide, and may be considered as clear profit to the smelter, who is obliged to use some kind of iron flux, and can find nothing, unless it be metallic iron, better adapted to his purpose than these tailings. Chlorination tailings can also be utilized in the manufacture of red paint.—*Aaron's Leaching Gold and Silver Ores.*

TELEPHONES FOR LONG CIRCUITS.—It has been found that wires, when employed for a telephone circuit, are much more susceptible to disturbing causes than when employed for transmitting telegraphic signals. It has been observed that the slightest friction, such as will inevitably occur from the ordinary mode of joining telegraph wires, the closing of a pressure screw anywhere on the circuit, the slightest blow upon the wire, vibration from wind, the ordinary modes of support, etc., which produce no perceptible effect on the transmission of telegraph signals, are great hindrances to the transmission of voice vibrations, and thus confine the telephone to comparatively short circuits. It is thought if these hindrances could be avoided, the telephone circuit might be continued to as great a length as the telegraph—even across the ocean. Experiments are now in progress to determine all the facts connected with this matter. These experiments will involve the character, in quality and size, of the wire to be used, the best form of support, and a substitution of soldering the ends together, instead of the usual mode of joining. There is much reason for the belief that the telephone may ultimately as fully supersede the telegraph for long, as it already has for short distances.

REFUGE ROOMS AND BREATHING TUBES FOR MINES.—The invention of Mr. Thomas Harrison, of Sedberg, Yorkshire, is intended for saving the lives of men in mines in case of explosions, fire or floods, and consists in making refuge rooms of boiler plate or other material, these rooms being provided with air-pumps, one pump to supply the room with air through a tube laid under the floor of the mine (to keep the tube from being injured), and connected to an air-shaft or a special blow-hole from surface. The foul air is exhausted by a second air-pump placed in the room, and the foul air is thrown outside and prevented from returning by a stop-valve, or the rooms may be supplied with fresh air from pumps or air compressors above ground. He fits these rooms with double doors, the inner door being provided with india rubber or other material to make an air-tight joint. The second part of the invention consists in laying tubes fitted with breathing taps to different parts of the mines, the said tubes being connected to the refuge room, or otherwise supplied with fresh air, the breathing taps being provided with covers (which may be easily removed) to keep them clean.

THE SULPHUR BUSINESS.—C. D. Rhodes, Supt. of the Humboldt Sulphur Works, at Rabbit Hole, informs the *Silver State* that the company refined 237 tons of brimstone last month, and have inexhaustible quantities of the crude article in sight at their mines. They ship several carloads of it weekly to San Francisco and their grinding works in Alameda county.

THE SILVER KING (Arizona) weekly shipments now run at a rate which will sum up considerably over \$1,000,000 per year, viz: about \$3,000 per day.



### Industrial School for Miners and Mechanics.

[Read before the American Institute of Mining Engineers by OSWALD J. HEINRICH, Principal of the School at Drifton, Luzerne Co., Pa.]

At the Baltimore meeting of the Institute in February, 1879, Mr. Eckley B. Cox, then president of the Institute, called attention in his address to the subject of secondary technical education, and gave an outline of a scheme for a school for boys, which it was intended to start at Drifton, Pa., on the general plan of the Steigerschulen of Germany. This school was first opened on May 7, 1879, when 29 applicants for admission, from 12 to 24 years of age, were examined. Of these 11 were admitted, the others being considered either too young or too deficient in primary education to profit by the instruction. In order that parents might be encouraged to send their children to the public schools, it was thought best not to receive pupils under 15 years of age.

The number in each class is limited to 16, so that each boy may receive proper attention. Of the first class only 8 passed through the full year's course. At the end of the year, on June 29, 1880, a public examination was held with the most gratifying success.

The second year opened on the 1st of September, 1880. Nine candidates were then admitted after examination, and 3 more later in the course; 1 pupil has been dismissed. The school now comprises 19 pupils, 7 in the advanced and 11 in the preparatory class. There is also one boy in attendance at the drawing lesson who is too young for the other classes.

Thus far, the regular instruction has been given only for two hours each evening, Sunday excepted. At times when the pits are closed the pupils are requested to attend during the day from 9 to 12 A. M., and 2 to 5 P. M., the time being occupied in the drawing-room or in solving problems, or in review. If a sufficient number of boys from the regular classes are present, the regular studies are pursued. Attendance during the day is, however, voluntary. The limited, and to some extent uncertain, time devoted to instruction is a disadvantage to the school, but it must be borne in mind that the school is as yet an experiment, and that the boys and their parents have to learn from experience that an education is worth the pecuniary sacrifice which would be involved in working half time and attending a day school.

The interest evinced by the pupils thus far is very gratifying, as is shown in the following figures, expressing their attendance and progress during the first three months of the session:

For attendance—Grades.....	10	9½	9	8½	8	7½	6½	5
Number of Pupils.....	4	3	6	1	3	1	1	1
For Progress—Grades.....	9½	9	8½	8	7			
Number of Pupils.....	1	4	6	5	3			

A grade of 10 signifies "perfect," and 5 "indifferent." The plan of instruction is, in general, as follows:

I. A Preparatory Class.—In this class English branches are taught—spelling, reading, writing, grammar, the elements of composition, arithmetic and geography. An assistant teacher has charge of these branches. Algebra is studied as far as involution and evolution. In teaching geometry, particular stress is laid on the names, properties, and relations of geometrical figures in connection with geometrical construction in drawing. Both free-hand and mechanical drawing are taught with especial regard to developing artistic perception and the power of correct expression. Object lessons are also given to stimulate the reasoning faculties, which we often find but very imperfectly developed. In this preparatory class it is intended to admit boys under 15 years, that they may be well drilled in the elementary branches and better prepared for the next class.

II. The Junior Class.—In this class the English branches are continued, particular attention being paid to composition. The elements of book-keeping are also taught, which serves, by the way, for an exercise in writing and arithmetic. Algebra is continued to equations of the second degree, with one or more unknown quantities, series, and exponential equations, including logarithms.

The boys are also drilled in mental arithmetic and algebra to develop the power of quick perception and decision. The course in geometry is completed, including trigonometry, mensuration, and solid geometry. There is also provided an elementary course in analytical geometry, which is taught as algebraic projection in relation to geometrical projection and mathematical drawing. Geometry is divided into two parts—algebraic and practical geometry. In the first the subject is developed algebraically, with the aid of trigonometrical properties of angles; in the second, the practical applications are seen in the solution of problems and in construction of figures both on the drawing board and in the field. A course in geometrical projection aims to give the pupil facility in drawing any figure in plan, elevation or section which may be called for, both with instruments and free-hand.

In the course of mathematical physics, instruction is given in the elements of natural philosophy. To save time the mechanical portions, as, for instance, the laws of motion, center of gravity, the mechanical forces, etc., are treated mathematically, and the course becomes thus a combination of elementary mechanics and natural philosophy. Where feasible, experimental demonstrations are given.

Chemistry is taught so that the pupils may become acquainted with names, properties, and

combining proportions of the most important elements, particularly with those which enter into the composition of the common minerals. Simple chemical tests for minerals are also taught. The instruction in mineralogy and lithology is confined to the more generally occurring minerals and rocks, and those in which the miner or manufacturer has the most immediate practical interest. In this junior class a thorough knowledge of elementary mathematics and drawing is considered the basis for all subsequent instruction.

III. The Senior Class.—The course of instruction laid out for this class will include the writing of a plain, intelligible report upon some practical subject, either directly from investigation or from memory. This concludes the instruction in English branches. In the drawing-

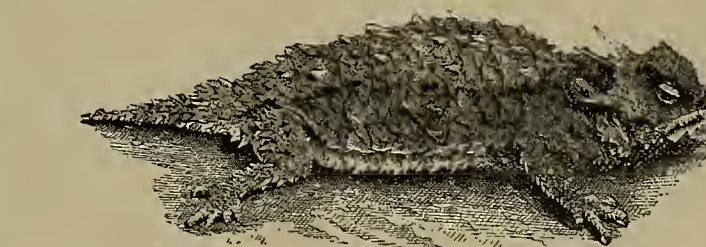


A NATIVE OF ARIZONA.

room the work will include the elements of construction in wood, stone and metal, making working drawings, and designing simple structures and machinery. Lectures will accompany this course.

The subject of mining will be treated systematically under the following heads:

1. Mining, including,
  1. The useful minerals and metals; their occurrence, and the methods for their exploration.
  2. The various means employed for the extraction of ores, etc.



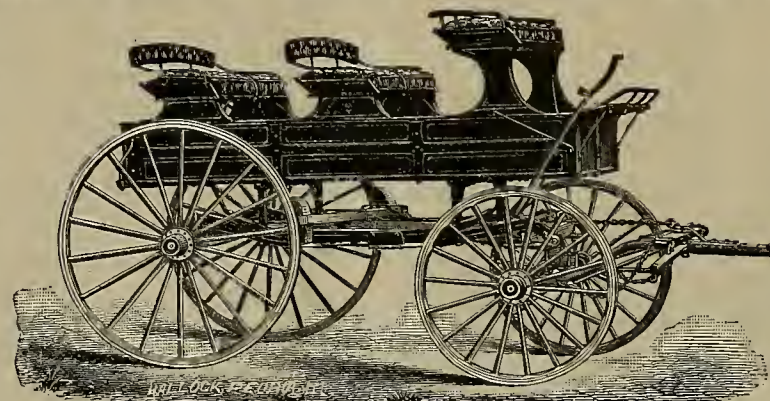
A NATIVE OF CALIFORNIA.

3. The opening and laying out of mines.
4. The method of exploitation.
5. The maintenance of mines in good order.
6. Transportation.
7. Drainage.
8. Ventilation.
9. Mine surveying and mapping.
10. Accidents in mines, and their prevention.
11. Mining accounts, contracts and estimates.
12. Hygiene of mines, with the remedies to be adopted in case of accident.

II. Preparation of the useful minerals for smelting or for market, which will include the

Americans (9 of Irish descent).....	12
Welsh.....	3
Irish.....	3
Swede.....	2
French.....	1

A noteworthy change is noticed in the pupils with regard to their appearance and dress, which are much improved by their attendance at the school. The effect of the school is also shown in the expressions of regret heard from many young men that they had not entered the school at the start, and some of the foremen deplore the fact that there was not such a school when they were boys. The success of this



THOROUGHBRACE WAGON OF THE SWEEPSTAKE PLOW CO.

machinery used in ore-dressing and in the mechanical preparation of coal.

During the senior year there will be practical exercises in the mine and in the field, which will involve the presentation of reports to the principal.

It is possible that there may be formed a fourth class, to be known as

IV. The Expert Class.—This class will enable pupils and graduates at their leisure to continue their studies with the instructors outside of the regular classes, and thus perfect themselves in certain branches already gone over, or to take up studies not provided for in the course.

It is required that all the pupils must have regular work in the mines or in the shops, and, as far as possible, arrangements are made to accommodate them.

The instruction is entirely free, the pupils providing only their books and materials. Annual public examinations take place and prizes are awarded to the best scholars.

The school-rooms are in Cross Creek hall, a large building 106x51½ ft., having a basement room 12 ft. high and an upper hall 42 ft. high. In the basement are the office of the principal, 18x14 ft., two large class-rooms, 31x22 ft. and 32x15 ft., and a drawing-room 28x18 ft. There are also a lecture-room, 49x30 ft., and a reading-room with a library the same size, all for school purposes. The reading-room is open every evening for the use of the employees. A separate building, 34x16 ft., contains the laboratory and lecture-room for chemistry and mineralogy. The school-rooms are open all day and until 9 o'clock in the evening. They are all lighted by gas and heated by steam. Collections of apparatus and minerals for purpose of instruction have been commenced, and it is the aim to illustrate the lectures as far as possible by facts from every-day practice. The instruction is given by the principal, assisted by Mr. D. D. Davidson, a graduate of Lafayette College, who teaches the English branches, bookkeeping and elementary mathematics.

It is in the highest degree gratifying to record the praiseworthy conduct and punctual attendance of the boys; and the progress in their studies has been very fair, considering their previous ignorance. The nationalities represented in the school are as follows:

industrial sections of Europe, and I do not see why it cannot be introduced with us.

The keynote of success, let me say in conclusion, is not to endeavor to turn out young engineers, but to raise up intelligent foremen.

### Two "Natives."

We give on this page engravings of two curious reptiles, one of which is peculiar to Arizona, and the other, both to Arizona and California. The "Gila monster," or Aztec lizard (*Heloderma suspectum*), is a very curious looking specimen. The engraving was made from a photograph of one brought from Arizona by J. C. Lemmon. The specimen is a female, and is 19 inches long—the body—with its thick kangaroo-like tail, weighing two pounds. Its color is yellow, with clearly defined black scales one-eighth of an inch in diameter, resembling the marking of a butterfly. This peculiar appearance is said to be the model which the Aztecs followed in making their pottery. The Mexicans have also decorations after the same pattern, and the Indians of this coast certainly follow it in their basket work. The reptile is not common, and is known to be the rear guard of the past race of prodigious fauna represented by *Megatherium*, etc. It is slow motioned. The Indians eat it, and the coyote and fox eagerly dig it out of its burrow in the sand, and the white eagle, hawk and vulture prey upon it when exposed. It feeds on the young and eggs of other animals. Here is a curious fact about this reptile, which is that its two sides do not correspond in markings.

We also give an engraving of a "native Californian," a sort of foster brother to our Aztec friend, and occurring in Arizona as well as he. In the volume on zoology in Lient. Wheeler's "Surveys West of the 100th Meridian," it is stated that they found the *Phrynosoma*, or "horned toad," very numerous. There are 11 distinct species of this interesting little reptile, according to Prof. Cope. The one shown in the engraving is the form found in California, and Arizona—*Phrynosoma cornuta*.

In its general aspect it somewhat resembles a frog, and is called a horned toad, though really a nearer kindred to the lizard tribe. In fact, it is a true lizard, and is in no respect a batrachian. The genus, which is North American, is characterized by a more or less oval body, flattened and covered with tuberculated scales, the head having sharp spines or knobs.

In confinement the reptile is sluggish, but it is said to be active in pursuit of insect prey in a wild state. It passes the winter in a state of lethargy in holes dug by gophers and other rodents, coming out in April generally. Those specimens which we have burrow under the soft earth in their box, covering themselves entirely up. They are very abundant on the Fresno plains. Those interested in the natural history of the reptile can find detailed descriptions in Stanbury's "Expedition to Great Salt Lake," and Vol. II. of the "Mexican Boundary Survey."

### Sweepstake Thoroughbrace Wagon.

People who live in mountainous, rough, or newly settled countries, appreciate the uses and beauties of thoroughbrace wagons more than those who live where smooth, well-finished roads are the rule. A great many styles of thoroughbrace wagons are made, and on this page we give an engraving of one made by the Sweepstake Plow company. In the prominent advertisement of the company, which appears upon another page of this issue, may be seen other styles of vehicles of the same manufacture. The thoroughbrace wagons are built for general business, passenger, express, and freight wagons. The two hind seats can be easily removed, thus fitting the wagon for a load of fruit or merchandise. They can also have a top for ataging, and a front and hind boot if desired.

The Sweepstake company will move to their new and extensive works at Benicia next month, at which time we expect to have a description of the new buildings and arrangements for manufacturing.

A CANNON WITH A RANGE OF TEN MILES.—There is now being cast at the Reading, Penn., Iron Works, a cannon which experts say will throw a ball 10 miles, if not 12 miles, whereas 5 and 6 miles is considered a good range for the best cannon now in use. The gun is an improved accelerating or multicharge gun—a modification of the Lyman-Haskell pattern. It will be 25 ft. long, and have a bore 6 inches in diameter. Along the bore will be 4 pockets, in each of which a charge of powder will be placed, with the view of accelerating the ball after it leaves the chamber of the gun and during the progress through the bore. The charge of powder will be 130 lbs., and the weight of shot 150 lbs. It is calculated that a shot from the gun will penetrate through 2 ft. of solid wrought iron.

ENGLAND IMPORTING IRON ORE.—It will be surprising to many of our readers to know that 2,600,000 tons of iron ore were imported into Great Britain last year. Of this importation over 2,000 tons came from Bilbao. This ore was of superior grade, suitable for making Bessemer and open-hearth steel. The total production of iron ore in the United Kingdom for the year was \$17,500,000 tons.



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**Dissolution of Copartnership.**

The partnership heretofore existing between George Spaulding, James Munroe Miller and Dwight Germain, in the City and County of San Francisco, State of California, under the firm name of George Spaulding & Co., is this day dissolved by mutual consent, said James Munroe Miller retiring from said firm.

The new firm of George Spaulding & Co., commencing at this date and being composed of George Spaulding and Dwight Germain are authorized to collect the outstandings and accounts and will pay all claims against the late firm.

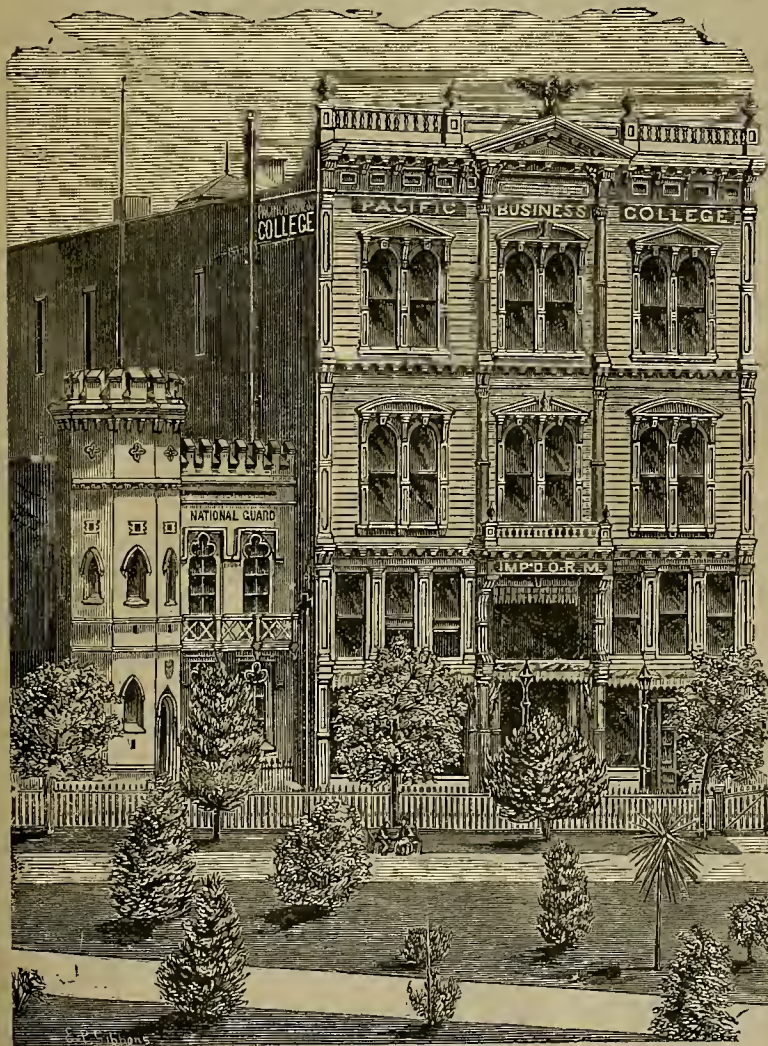
GEORGE SPAULDING,  
JAMES MUNROE MILLER,  
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Dated at San Francisco this First day of April, 1881.  
The business of Job Printing and Publishing in all its branches will be continued as heretofore by the new firm of George Spaulding & Co., at 414 Clay street.

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### The Magnetic Needle, and Mining Plans.

Recent events in connection with mining operations show most forcibly the great importance of having the working plans of mines almost mathematically correct, yet we have had plain proofs that many, considered in every way most reliable, have just been the reverse. Many of the mining surveys now in use, says the London *Mining Journal*, cannot be relied on within five or ten yards at a distance from the shafts, and the protracting of one line from the preceding ones, and so on in succession, perpetuates every error, and is a system of "judging," as it is termed, that should not be adopted by the mining engineer. In many instances the taking of the magnetic variations have been entirely disregarded, and this has led to many errors appearing on plans. In taking the meridian there was a great deal of difference in the observation taken on one day and that observed on another. To some extent, no doubt, the atmosphere affected the needle, for oxygen being a component part of it was a substance that attracted the needle, and it was also probable that the heat of the sun also affected it. The difference in the weather and the seasons of the year, it may be taken, had a tendency to a variation of this needle from the true meridian. To determine the deviation of the plane of the meridian, or of the due north, it was usual for the direction of the pole star to be taken while the first star in the tail of the constellation of the Great Bear was passing precisely underneath the polar star. The true pole was a point in the line joining the two stars a little removed from the pole star, just opposite to the next star which is visible to the naked eye. It has been said that greater accuracy has been obtained by taking what is termed the "solar meridian," but how this can be done does not appear to be known to many of our mining managers. One gentleman has informed us that he has taken it frequently by a transit instrument; all that was required being to find the proper time the sun was passing the meridian of a certain place, and then fixing, on some important station on the surface, make the observation at the proper time. The Ordnance maps were generally tolerably correct, and they were used to find the longitude of the place wanted or required. As to taking the time, which, of course, was required to be most exact, it was done by ascertaining the Greenwich time at a place and then correcting it by means of calculation, so as to obtain the mean time at Greenwich.

As to old mining plans, as a rule, it is no doubt correct to say that if they were now brought into use, to have the workings correctly carried on such could not be done without going and comparing them or getting the true meridian again. But it has been stated by one of our mining engineers who has paid a great deal of attention to the subject, that by adopting the solar meridian there would be a universal similarity in all plans, as every plan would be drawn on the proper meridian. Every plan throughout the country would be as parallel as possible, and by that means they would be able to compare them at once. However, the taking of the solar meridian as yet has not been adopted by many of our mining engineers, who consider it of more importance to know the variation of the compass from a certain line. Still it has its advocates, whose number will in all probability increase, for it has its attractions, especially among the young members of the profession.

One of the simpler methods by which the meridian can be approximately determined is by drawing a thin rod vertically on a drawing board or some level surface, the shadow cast by the rod being measured a short time before midday, and the vicinity marked. Through the point with the rod as a center the arc of a circle is struck, when the extremity of the shadow again touches the arc after midday, the point where it touches is marked, and midway between the extremities of the two shadows may be found the point, which is in the same meridian as the rod itself. It is, however, most desirable for future reference to mark by strong stakes at several chains distance on either side of the shaft the meridional line which has been taken as a base for the survey. In the surveying of boundary lines on the surface, or of the mainways in the skeleton of the survey underground, the compass should be entirely discarded. Where very great care has not been taken it may be said the use of the magnetic needle underground, where the greatest accuracy is so necessary, has led to many errors which have led to litigation and loss of time by driving in the wrong direction. Surveying, however, can be done without a needle, especially where there is only one shaft, and this can be effected by two thin copper wires carrying heavy weights at the bottom immersed in buckets of water to diminish the oscillation, a deal straight edge being fixed so as almost to touch each wire at right angles to the line between them. The extremes of six or ten successive oscillations should be marked with a pencil on each straight edge, and the mean taken with a pair of compasses, and the wires fixed to such mean points. Standing behind the wires the surveyor should next send a candle along the heading as far as it could be seen, and fixed in a line with the wires, and this operation should be repeated in the opposite direction, placing a candle against one of the wires, and to check the whole it should be seen whether the

three candles are exactly in line. The latter, being the basis of the whole underground survey, should be permanently marked by a few pegs driven into the roof with nails in them, or by some other marks. On the surface permanent pegs should be placed at some chains distance on each side of the shaft in a line with the wires. By this means there is obtained a line on the surface exactly corresponding with the base line of the operations underground.

This system has been found to be a really good one after the most severe tests that it was possible to have, not only in ordinary mining

plans, and these have at many places been entirely ignored, and with serious consequences to the owners of mines. In one case we are told of two beds of coal which were worked simultaneously according to the plans, and the result was that there was a difference of several chains, which greatly astonished the engineers. Only recently, too, in an action tried in one of the Superior Courts, heavy damages were awarded to a mine-owner for trespass and getting minerals by the party who had gone beyond his boundary, owing to the inaccuracy of the plans. To have plans accurate and



LONE PEAKS, BETWEEN EHRENBURG AND PRESCOTT, ARIZONA

but in tunnelling as well. Surveys for the purpose of ascertaining the extent and direction of underground workings should be so trustworthy and accurate as to enable the surveyor to show from this map or plan the very points on the surface below which the mineral has been taken in every way reliable it has been suggested that there should be a long line on the top, showing the variation of the compass at every time, so that means no errors could well arise. However, the importance of accurate plans in connection with every description of mining opera-



REGION OF THE THOUSAND WELLS, ECHO CLIFF, ARIZONA

away, and to what extent the subterranean excavations have extended. This, under ordinary circumstances he can do by taking the horizontal dimensions of the surface area from which the mineral has been excavated beneath. Another means frequently used in surveying was by having three stones in a line, and testing the compass frequently, when a correct survey could be ensured by a competent surveyor, and this could be done in thin seams of minerals where the theodolite could be brought into use. The magnetic needle, however, was a rather favorite mode of surveying, but in connection with it; but it was affected by magnetic stones and ironstone. Still, in making surveys of mines there can be no question as to the importance of the taking accurate note of the magnetic variations, so as to ensure the accuracy of

tions cannot be too forcibly expressed, nor can the best known systems be too often brought under the notice of mine managers and mining engineers, on whom so much responsibility rests for the safety of those employed under them, as well as for the security of the property placed in their keeping.

THE temperature in the Suto Tunnel at the drill hole, south lateral header, is 112°; at the Savage, 88°; at the Yellow Jacket connection, 90°; at the Yellow Jacket shaft, 76°, and at the Julia, 109°.

EVERYBODY will be glad to know that the managers of the last walking-match held in New York were \$4,000 out of pocket when the show ended.

### The Hydraulic Mining Injunction.

We gave, last week, the details of the suit which has resulted in an injunction being served on certain hydraulic mines in this State, causing them to shut down. This question of the outcome of the whole trouble is an important one, and we have seen no better description of the present situation than is given in the following paragraph from the Grass Valley *Union* of this week, a paper published near the scene of the mining operations which the injunction stops:

Although the injunction suit of the city of Marysville has caused the stoppage of nearly all of the principal hydraulic mines of this county that discharge their tailings into the Yubas and their tributaries, all of them have not been enjoined, or were not as late as Saturday; but the mines that were then operating were hourly looking for the service of the legal process which would cause their stoppage. Of those that have stopped theirs has been quite a general dismissal of employees, and the uncertainty of this situation causes much anxiety to the miners who have families depending upon them for support. While the suspension of work is a great inconvenience and loss to the mining and canal companies, that of itself is not as great a hardship as that which befalls the working miner. The companies have to endure the loss of the interest upon their investment for the time being, from which they can recoup when permitted to start up their works again, and the gold in their claims does not escape in the meanwhile. But with the miner his labor is his capital, and every day's loss of labor is absolute, for which he can have no compensating return. To him and to every business contingent upon the working of these mines the matter is of grave concern. There is a hope that a way will be found to dissolve the temporary injunction, and permit the work of the mines to go on as was done in the Bear River suit, but if the miners are compelled to remain idle until the final close of litigation in the Supreme Court it will be almost a life and death matter with hundreds of people.

So far, there has been no injunction placed upon the hydraulic mines bordering on the Bear river, but it is understood that proceedings of that kind are under way, and at almost any day the hydraulic companies of that region may expect a summons to stop work. It is the impression that the farmers and the people of that portion of the valley injured by the debris have combined for a general onslaught upon the hydraulic miners, and that it is the intention to shut down every mine of this character in the State. The anti-debris men and the newspapers that speak their sentiments say that the war has begun in earnest and that there is to be no peace until hydraulic mining is discontinued entirely. It is said that the anti-debris associations have and are collecting a large fund, the money being raised by a tax per acre on farming lands, amounting to much more than the tax levy by the debris law for reclamation purposes. These valley people are showing themselves terribly in earnest, and the miners may make up their minds that they have a big fight on their hands, which must be fought through to the bitter end. Whether the contest will be alone confined to litigation in the courts or to adverse legislation in the Capitol of the State, time alone will tell.

### The Lone Peaks, Arizona.

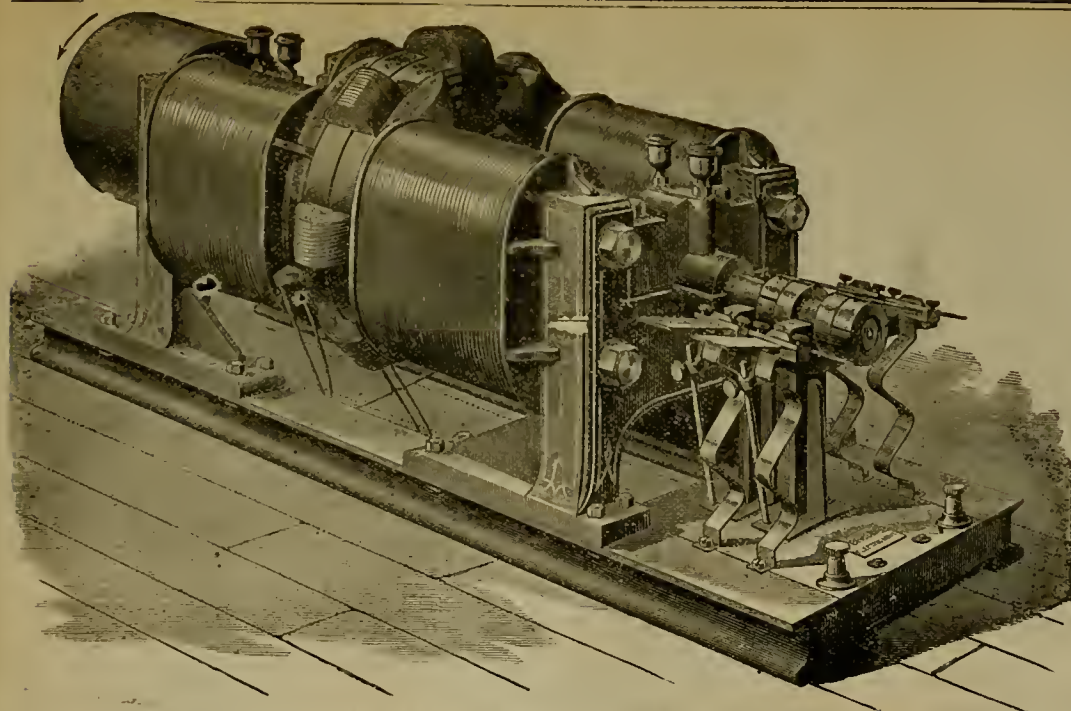
We illustrate one of the peculiar isolated peaks which arise in different portions of Arizona. One of the most bold and pleasing of these is to be seen on the old Stewart & Pearson stage road from Ehrenberg to Prescott. After riding for miles and hours over the broad sandy plains, with the distant mountains forming a pleasing enclosure to a vast natural stage upon which many a weird and midnight scene has been enacted, to come holdly upon these lone peaks (there are two of them) standing side by side is a scene worth the whole ride. As the stage passes by close to their base, they look down frowningly upon you; and were you superstitious, would almost think they spoke to you in the eerie stillness of the night.

### Region of the Thousand Wells.

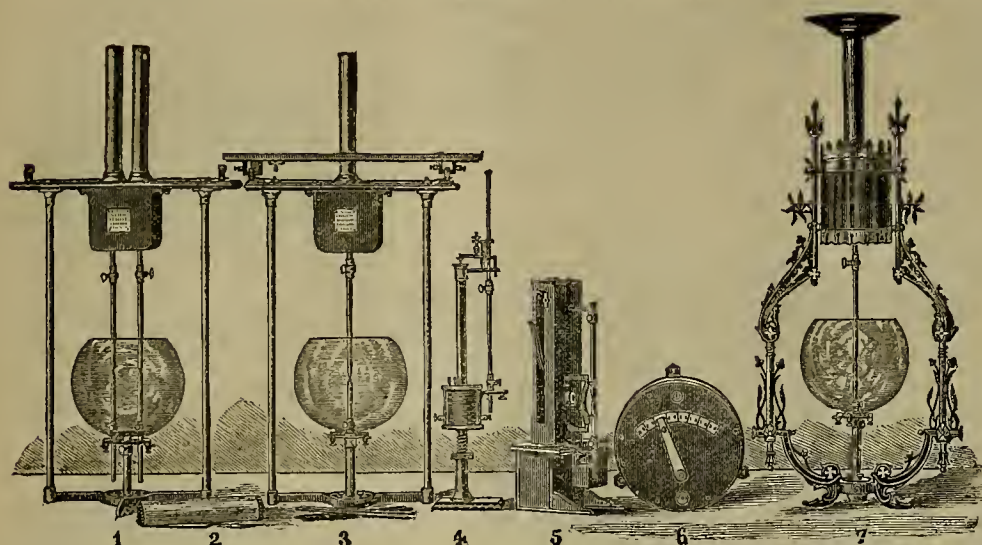
"The Region of the Thousand Wells," of which we give an illustration on this page, are located on the western slope of the Echo cliff on the Colorado river, Arizona. It is a wild region, the surface is deeply furrowed or eroded, and shows the work of great grinding and wearing agencies in the years ago. This piece of landscape includes a few of many remarkable natural formations known as the "thousand wells." After a shower these pot holes are filled with water. These wells are used by the Indians as water sources during their wanderings; but the chosen abode of the Indians is on the eastern slope of Echo cliffs, where numerous springs are found which are their famous watering places.

THE losses to Iowa farmers this year from poor seed will amount to \$2,000,000.





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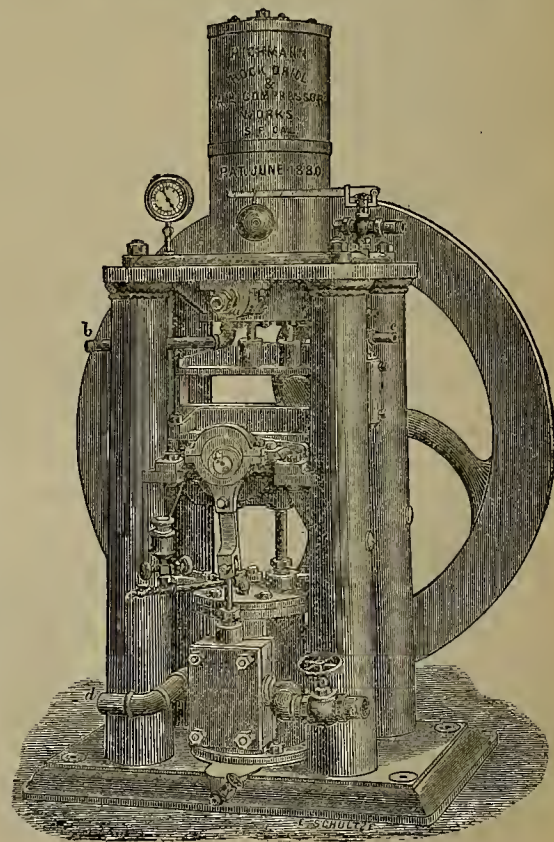
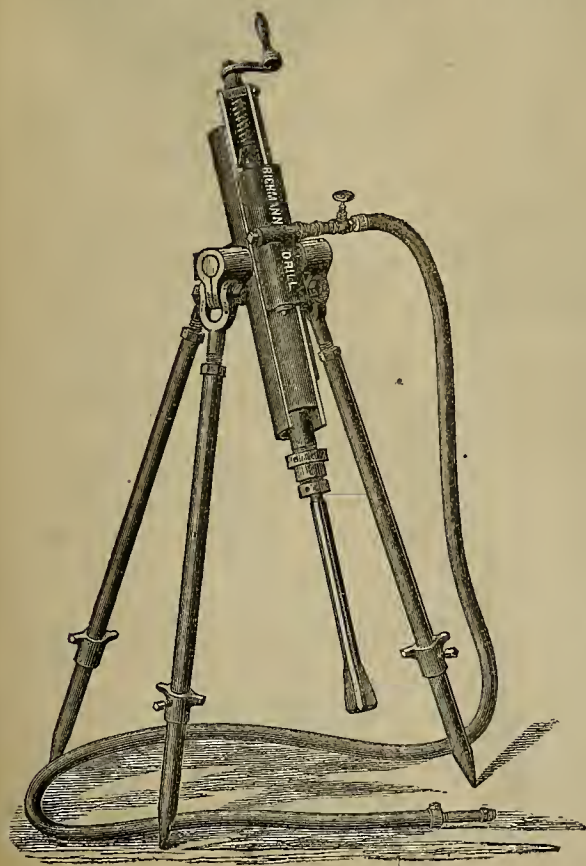
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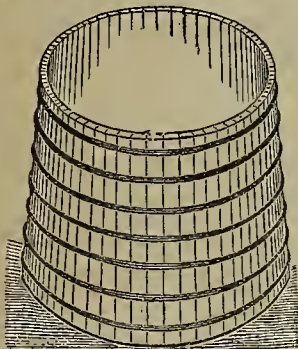
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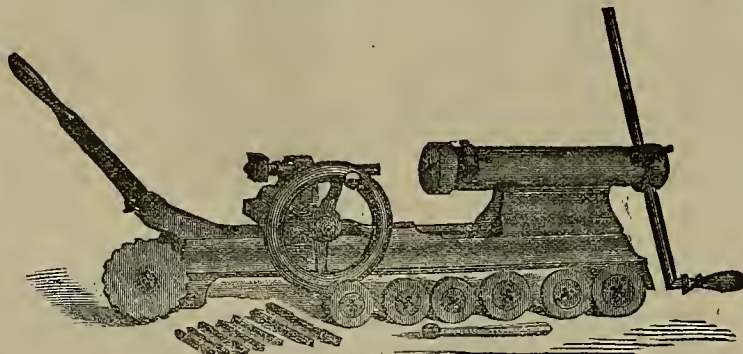
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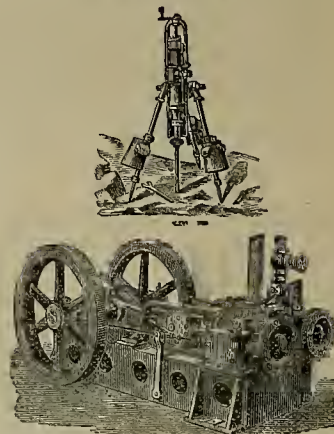
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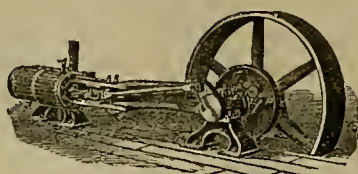
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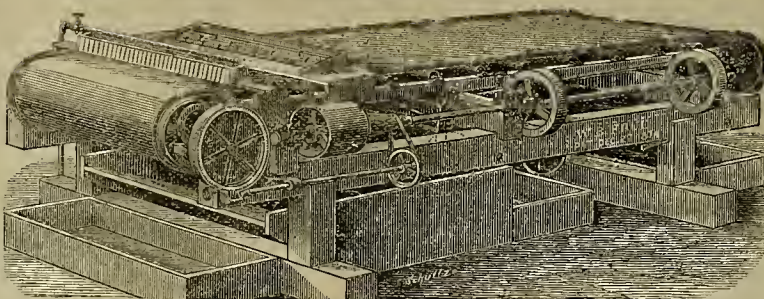
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING MAY 31, 1881.

242,320.—SIDE-HILL PLOW—Frank A. Hill, San Leandro, Cal.  
242,233.—WAVE-POWER—J. W. Swales, S. F.  
242,236.—SEWER TRAP—Pedro Torelli, Benicia, Cal.

FOR THE WEEK ENDING JUNE 7, 1881.

242,550.—BALING PRESS—Nelson Arve, Utah.  
242,567.—OATE—A. P. Campton, Rhonerville, Cal.  
242,610.—APPARATUS FOR SEPARATING SULPHURETS IN OIL—Washington—W. E. Devan, Owin Mine, Cal.  
242,639.—GRAIN THRESHER—J. S. Heald, Vallejo, Cal.  
243,040.—GRAPE CRUSHER AND STEMMER—J. L. Heald, Vallejo, Cal.  
242,045.—CASTER—Geo. W. Horne, S. F.  
242,542.—DRESS CHART—Ellen K. Kinker, Corvallis, Oregon.

243,069.—COMPOUND FOR FACILITATING THE AMALGAMATION OF GOLD AND SILVER—W. H. D. Mathews, C. C. Ayres and M. D. Campbell, Bodie, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign, Patent Agency, the following are worthy of special mention:

**GRAPE ELEVATOR CRUSHER AND STEMERS.**—John L. Heald, Vallejo. Dated June 7th, 1881. No. 242,640. This apparatus is principally useful in preparing grapes for wine making. It consists of a pair of corrugated or fluted crushing rollers, which run together and are driven by suitable gearing; these rollers being provided with an attachment, by which they are separated and thrown out of gear whenever any hard substance or body which could injure them passes through. Below these rollers is a cylindrical case having its lower part perforated, and having a shaft extending longitudinally through it. This shaft has radial arms attached to it, so as to form a spiral extending from end to end, the object of which is to press the grape pomace through the perforated bottom of the cylinder, and to carry the stems and worthless portion out at the end of the cylinder. Below this cylinder is an inclined grating, upon which the pomace falls, and from the lower end of which it is delivered into the cars, to be carried to the press, a hinged, movable gate controlling its discharge. The grapes, either loose or in boxes, are placed upon a peculiarly constructed elevator, the whole forming a very effective apparatus for the purpose.

**SEWER TRAP.**—Pedro Torelli, Benicia. Dated May 31, 1881. No. 242,236. This invention relates to inlet or slit hasins and traps for sewers, to be placed at the corners of streets and connecting with the sewer pipes. It consists in a double compartment chamber, said compartments opening into each other at the bottom; one of which is so constructed as to contain earth, or other like substance, to prevent the escape of the gas through said compartments, while allowing ready access thereto for purposes of cleaning, the other of said compartments receiving the water and preventing the return and escape of noxious vapors by reason of the separating partition reacting below the water level. Both compartments are covered by a lid above, and provided with an opening, fitted with a plug, in the bottom, to allow the escape of the water when desired, which remains below the level of the exit part. These compartments are appropriately provided with inlet and exit parts, the former being in relation with the gutter, and the latter connected with the sewer pipe. The advantage of the invention is the ease with which it can be reached in all its parts to clean it.

**GRAIN THRESHER AND SEPARATORS.**—John L. Heald, Vallejo. Dated June 7th. No. 242,639. This invention relates to certain improvements in that class of machines in which the threshing and separation of grain are performed as a continuous operation; and it consists in such a combination of beaters, pickers, carrying belts, sieves, chutes and fans, that the inventor is enabled by their use to produce a very perfect separation of the grain from the masses of straw with which it leaves the threshing cylinder, and to thoroughly clean the grain from chaff, harley, mustard or other foreign substance or impurities, so that it is delivered as first class grain by the single continuous operation, and without the use of any supplemental machine or fanning mill, such as are usually hauled around with the separator, the object being to combine the whole in one machine.

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### Metals.

[WHOLESALE.]

WEDNESDAY, June 15, 1881.

IRON.—		
American, Pig, soft, ton.....	— @ 20 00	
Scotch, Pig, ton.....	— @ 20 00	
American White Pig, ton.....	— @ 20 00	
Oregon Pig, ton.....	— @ 20 00	
Refined Bar.....	4 1/2 @ 8	
Horse Shoes, keg.....	7 00 @ 8 00	
Nail Rod.....	— @ 9 1/2	
Norway, according to thickness.....	8 1/2 @ 9 1/2	
STEEL.—		
English Cast, lb.....	16 @ 18	
Black Diamond, ordinary sizes.....	13 @ 15	
Drill.....	9 @ 10	
Flat Bar.....	9 @ 16	
Plow Steel.....	9 @ 10	
COPPER.—		
Ingot.....	— @ 52	
Sheet.....	— @ 20	
Sheathing, Tinned Half.....	— @ 42	
Nails.....	— @ —	
Bolts.....	38 @ 42	
Old.....	— @ 13	
Bar.....	— @ 22	
Precipitate, 100 fine.....	18 @ 19	
LEAD.—		
Pig.....	41 @ 41	
Bar.....	— @ 6	
Pipe.....	— @ 8	
Sheet.....	— @ 9	
Shot, discount 10% on 500 Bags.....	— @ 2 10	
Drop, per bag.....	— @ 2 30	
Buck.....	— @ 2 50	
Chilled.....	— @ 2 50	
TIN PLATES.—		
10x14 I G Charcoal.....	— @ 8 00	
10x14 I G Coke.....	— @ 5 50	
Banca Tin.....	— @ 25 00	
Australian.....	— @ 22 00	
I. C. Charcoal Roaming 14x20.....	— @ 7 25	
20x28.....	20 00 @ 21 00	
ZINC.—		
By the Cask.....	— @ 9	
Zinc, Sheet 7x3 ft. 7 to 10 lb, less the cask.....	— @ 10	
NAILS.—		
Assorted sizes.....	3 50 @ 3 75	

### ANNUAL MEETING.

The annual meeting of the Stockholders and Directors of the Warren Powder Co. will be held at 2 o'clock on Tuesday, June 25th inst., at the office of the Company, 24 Merchants' Exchange, OUSTAVE FRANK, Sec'y. San Francisco, June 14, 1881.

## A New Quartz Pulverizer.

DESIGNED FOR

### WET OR DRY WORK.

Has been working for the last six months, and has given satisfaction to everyone who has witnessed its operations. Can be seen working daily at Hoffmann Bros' Sampling Works, 415 Mission Street, S. F.

W. I. TUSTIN, Inventor and Patentee.  
308 Mission Street, San Francisco.

## C. H. AARON, METALLURGIST.

Inventor of a new process for precipitating Gold from its solution. Author of

### LEACHING GOLD AND SILVER ORES.

CHLORINATION OF  
GOLD SULPHURETS A SPECIALTY.

Room 49, Merchants' Ex.,  
SAN FRANCISCO.

# THE O'HARRA CHLORIDIZING FURNACE.

Patented, 1878.

This Furnace is Constructed with two SEPARATE HEARTHES, one for DESULPHURIZING and one for CHLORIDIZING the Ore.

BOTH PROCESSES ARE PERFORMED AT ONE OPERATION.

An endless chain carrying conveyors or scrapers passes continuously through over both hearths, going one way through one chamber and the other through the other chamber. By this means the ore is fed and discharged at the same end of the furnace.

The chain and hoes pass out of the furnace into the open air,

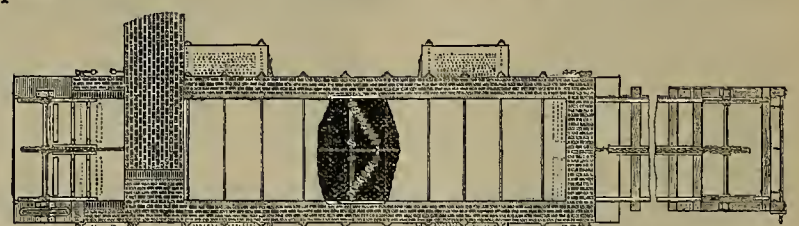


SIDE ELEVATION OF THE O'HARRA FURNACE.

in the revolution, so they are not too much heated.

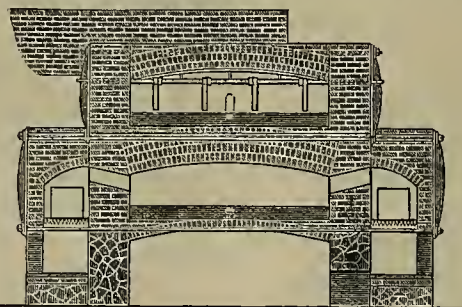
A cheap furnace to build and to run.

Supplemental fireplaces are so arranged that the heat is under perfect control.



PLAN OF THE O'HARRA FURNACE.

The process is essentially the same as the well-known Freiberg process; but the mechanical devices applied to the furnace and the peculiarity of its construction enable the inventor to thoroughly desulphurize and chloridize the ore to a higher percentage, than other furnaces, and with less cost for fuel and labor.



END VIEW OF THE O'HARRA CHLORIDIZING FURNACE.

### COST OF ROASTING

AT WASHOE AND OPHIR TAILINGS MILL, 40 TONS IN 24 HOURS.

Two Men.....	\$ 3 00
Three Cords of Wood at \$6 00 per Cord.....	18 00
3,000 lbs. Salt, at \$12 00 per ton.....	18 00

Cost of 40 Tons.....	\$44 00
Cost of 1 Ton.....	1 10

THE COST OF ROASTING AT EXCHEQUER MILL, 20 TONS OF ORE IN 24 HOURS, IS AS FOLLOWS:

One Man.....	\$ 4 00
One Man.....	3 00
Wood—1 1/2 cords, at \$3 per cord.....	5 25
Salt—1,600 lbs., at 2 1/2 cents.....	40 00

Cost of 20 Tons.....	\$52 25
Cost of 1 Ton.....	2 61 1/2

Potter & Hall, of Copper City, who have two O'Harra Furnaces, one for drying and one for chloridizing the ore. They say: Our ore is of a very base nature, consisting of sulphide of copper, iron, antimony and other base metals. Our average battery assay is about \$16 per ton. By the use of the Furnaces we roast and mill from 40 to 45 tons per day, and obtain from 90% to 95% of the assay value.

J. F. Ferguson, assayer, of Copper City, says: Our ore is of a very refractory nature, consisting of sulphides of copper, antimony, iron, and other base sulphides. We work on an average of 40 tons in one day of 24 hours, the ore averaging about \$16 per ton. Our chlorinations run from 90% to 95%. We work the ore up to 95% of the fire assay. The furnace costs very little for repairs. Both furnaces give entire satisfaction. They do the work intended as near as any furnace can do.

Lewis Chalmers, of the Isabella G. & S. M. Co., Silver Mountain, says: The O'Harra Furnace did all that is represented in the MINING AND SCIENTIFIC PRESS, roasting and chloridizing, at the figures there given, antimonial and arsenical sulphurates of silver up to from 84% to 95% of the assay.

The Washoe and Ophir Tailings Co. say: The O'Harra Furnace in operation at our mill for the past year has worked to our complete satisfaction. Our average assay is \$11 per ton. We roast with the furnace from 35 to 40 tons per 24 hours, chloridizing from 85% to 95% of the assay.

SEND FOR DESCRIPTIVE CIRCULAR TO

**WHITNEY, VEASEY & CO.,**  
Carson City, Nevada.



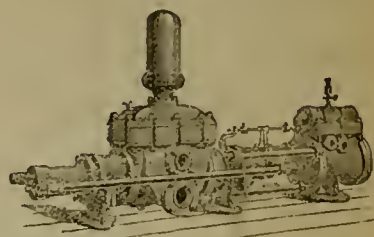
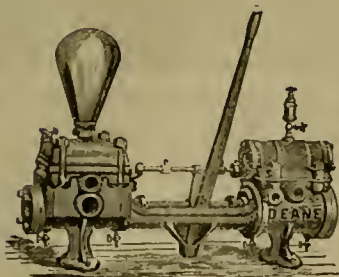
# FULTON IRON WORKS, HINCKLEY, SPIERS & HAYES,

(Established in 1855.)

WORKS—Fremont and Howard Sts.,

OFFICE—No. 213 Fremont St.,

SAN FRANCISCO, CAL.



**HOISTING WORKS**—Whims for prospecting small mines; Portable Hoisting Engine and Boilers with Reels, suitable for wire or hemp rope, of new designs, embodying all the latest improvements.

**MINING MACHINERY**—Hoisting Cages, with safety attachments, safety Hooks, Ore Cars, Ore Buckets, Water Buckets, Car Wheels and Axles, Ore Gates, with racks and pinions for Ore Bins, Pumping Machinery, Air Compressors, Air or Water-pipe Receivers, etc., etc.

**MILLING MACHINERY**—Gold Mills, with Pans or Concentrators, as required, Silver Mills, either for dry or wet crushing, with roasting and drying furnaces. Pans, Settlers, etc., as required. Smelting Furnaces, for either Lead, Copper, Silver or Gold. Willard's Roasting Furnaces, especially adapted for gold ores, Retorts, Bullion Molds, Ore Feeders, Rock Breakers, etc.

**MISCELLANEOUS MACHINERY**—Saw Mills, Flour Mills, Oil Well Machinery, Water Wheels and Castings.

**ENGINES AND BOILERS** for any and all purposes, adapted to the economical use of fuel.

PRICES MODERATE.

Among Others The Following Have Been Built By Us:

Tombstone Mill—15 stamps.....	for the Tombstone Mining Company	Sunset Mill—10 stamps.....	for the Head Center Mining Company
Corbin Mill—25 stamps.....	for the Corbin Mining Company	Grand Central Mill—30 stamps.....	for the Grand Central Mining Company
Contention Mill—25 stamps.....	for the Western Mining Company	Stonewall Jackson Mill—10 stamps.....	for the McMillan Mining Company

SEND FOR PRICE LIST.

AGENTS FOR THE PACIFIC COAST FOR THE DEAN STEAM PUMP.

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### REGULAR DIVIDEND NOTICE.

OFFICE OF

Northern Belle Mill & Mining Company,  
SAN FRANCISCO, JUNE 10, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 46), of Fifty (50) Cents per share, was declared, payable on Wednesday, June 15, 1881. Transfer books closed on Saturday, June 11, 1881, at 12 o'clock M.

WM. WILLIS, Secretary.

Offices—Room No. 29, Nevada Block, No. 300 Montgomery street, San Francisco, Cal.

### EXTRA DIVIDEND NOTICE.

OFFICE OF

Northern Belle Mill & Mining Company,  
SAN FRANCISCO, CAL., JUNE 10, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, an Extra Dividend (No. 47), of Twenty-five (25) Cents per share, was declared, payable on WEDNESDAY, June 15, 1881. Transfer books closed on SATURDAY, June 11, 1881, at 12 M.

WM. WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 300 Montgomery street, San Francisco, Cal.

### DIVIDEND NOTICE.

OFFICE OF THE

Standard Consolidated Mining Company,  
SAN FRANCISCO, JUNE 2, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 29), of Seventy-five Cents per share was declared payable on MONDAY, June 13, 1881, at the office in this city or at The Farmers Loan and Trust Company in New York.

WILLIAM WILLIS, Secretary.

Offices—Room No. 20, Nevada Block, No. 309 Montgomery St., San Francisco, Cal.

### DIVIDEND NOTICE.

OFFICE OF THE

EUREKA CONSOLIDATED MINING CO.

Nevada Block, Room 37, San Francisco, June 15, 1881.  
At a meeting of the Board of Directors of the above-named Company, held this day a Dividend (No. 68), of Fifty (50) cents per share was declared payable on Monday, June 20, 1881. Transfer books closed until the 21st instant.  
P. JACOBUS, Secretary pro tem.

### DIVIDEND NOTICE.

OFFICE OF THE

Silver King Mining Company,

SAN FRANCISCO, JUNE 7, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 18), of Twenty-five (25) Cents per share was declared, payable on WEDNESDAY, June 15, 1881, at the office of the Company, Room 19, No. 328 Montgomery street, San Francisco, California. Transfer books will be closed on June 10, 1881.

JOSEPH NASH, Secretary.

Arizona Mexican Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Globe District, Arizona.

Notice is hereby given, that at a meeting of the Directors, held on the 7th day of June, 1881, an assessment (No. 1), of Fifty (50) Cents per share was levied upon the capital stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary at the office of the Company, Room 39, No. 320 Sansome St., San Francisco, California.  
Any stock upon which this assessment shall remain unpaid on the 15th day of July, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 8th day of August, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. R. ADAMS, Secretary.

Office—320 Sansome St., Room 39, San Francisco, Cal.

### ANNUAL MEETING.

OVER MILLING AND MINING COMPANY.—The regular Annual Meeting of the Stockholders, for the election of a Board of Directors, will be held on Tuesday, June the 14th, 1881, at 2 o'clock, P. M., at the office of the Company, No. 402 Front Street, Room 8, San Francisco California.  
W. O. WILSON, Secretary.

Wolverine Gravel Mining Company.—Location and principal place of business, San Francisco, California. Location of works, Roach Hill, Placer county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Thirty-first (31) day of May, 1881, an assessment, No. Two (2) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately to the Secretary, at the office of the Company, No. 325 Front Street, San Francisco, California.  
Any stock upon which this assessment shall remain unpaid on the First (1) day of July, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the First (1) day of August, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.  
E. BLANDINO, Secretary.

Office, No. 325 Front Street, San Francisco, Cal.

## REMOVALS.

CALEDONIA  
GOLD MINING COMPANY.

The Office of the above-named Company has been moved to  
328 Montgomery St., Room 13.  
WM. LETTS OLIVER, Secretary.

CLARA  
CONSOLIDATED MINING COMPANY.

The Office of the above-named Company has been moved to  
328 Montgomery St., Room 13,  
WM. LETTS OLIVER, Secretary.

MAMMOTH  
MINING COMPANY.

The Office of the above-named Company has been moved to  
328 Montgomery St., Room 13.  
WM. LETTS OLIVER, Secretary.

Prize Medal, Mechanics' Fair, '80

W. H. OHMEN,  
ENGINE AND

MACHINE WORKS,

109 &amp; 111 Beale St., S. F.

Upright and Horizontal  
Engines & Boilers

A SPECIALTY.

Upright Engines  
from One to Ten  
Horse-power



BOOKS,

Relating to Casting and Founding, Electricity, Electric Light, Engineering, Drawing, Manufacture of Oils, Heat, Indicator Diagram, Link Motion, Mechanics, Screw Cutting, Steam Boilers, Steam Engines, Steel Turning, Wire Gauge, Workshop Receipts. Descriptive Catalogue sent on application.

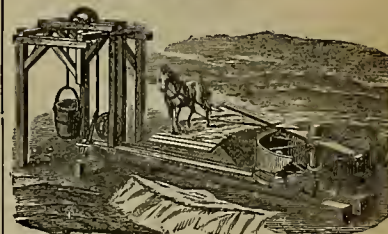
E. &amp; F. N. Spon, 446 Broome St., N. Y.

50 Landscape, Chromo Cards, etc., names on, 10c. 20 Oil Edged Cards, 10c. Clinton & Co., North Haven, Ct.

## INCERSOLL ECLIPSE ROCK DRILLS.



The Most Economical Air Compressors in the Market.



## MINERS' HORSE-POWER.

One Horse can easily hoist over 1,000 pounds at a depth of 500 feet. The Power is mainly built of wrought iron. The hoisting drum is thrown out of gear by the lever, while the load is held in place with a brake by the man tending bucket. The frame of the Power is bolted to bed-timbers, thus avoiding all frame work. When required these Powers are made in sections for packing.

REYNOLDS & RIX,  
49 Fremont St., S. F.

CALIFORNIA MILITARY ACADEMY,  
AT OAKLAND.

The next term will begin on  
Monday.....July 18, 1881.  
REV. DAVID McCURE, Ph. D.,  
Principal.

Dewey & Co. {202 San-} Patent Ag'ts  
{some St.}



## Iron and Machine Works.

### UNION IRON WORKS,

SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS AND ALL

Kinds of Machinery for Mining Purposes.

Flouring Mills, Saw Mills and Quartz Mills Machinery constructed, fitted up and repaired.

Front Street, Between N and O Streets,  
SACRAMENTO, CAL.

### Golden State & Miners Iron Works,

Manufacture Iron Castings and Machinery of all Kinds at Greatly Reduced Rates.

STEVENSON'S PATENT

Mold-Board AMALGAMATORS,

Golden State Pressure Blowers.

First St., between Howard & Folsom, S. F.

### California Brass Foundry,

No. 125 First Street, Opposite Minna.

SAN FRANCISCO, CAL.

All kinds of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bells and Gongs of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. **PRICES MODERATE.**

J. H. WEED.

V. KINGWELL.

### California Machine Works,

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119 Beale Street, San Francisco.

General Mechanical Engineer and Machinist. Steam Engines, Flour, Quartz and Mining Machinery. Sole manufacturer of Brock's Patent Rock Crushers and Steel-Faced Tappits. Agent and Manufacturer of F. A. Youse's Patent Steam Packing Rings for Steam Pistons. The best ever invented; can be applied to any Engine Piston and give entire satisfaction to those using. Steam, Hydraulic and Sidewalk Elevators. Repairing promptly attended to.

### STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, 49 and 51 Fremont Street, S. F.

THOMAS THOMPSON. THORNTON THOMPSON.

THOMPSON BROTHERS,

EUREKA FOUNDRY,

129 and 131 Beale St., between Mission and Howard, S. F.

MANUFACTURERS OF CASTINGS OF EVERY DESCRIPTION.

42 years' practical experience; 14 on Pacific Coast.

**Phillips & Co.**  
No. 1 WALL ST. N.Y.  
EXAMINERS OF MINES AND ASSAYERS  
CONSULTING ENGINEERS & METALLURGISTS  
AUTHOR OF  
The "Explorers' Mines and Metallurgist's Companion,"  
672 pages, 83 Illustrations (2d edition), Price \$10 50  
The "Explorers' and Assayers' Companion," of library or  
pocket size (3d edition), 408 pages, now ready, . . . 6 00  
Various Prospectors' and Assayers' Tools.  
SEND FOR LIST OF PRICES.

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Practical, Civil, Mechanical and Mining Engineering,

SURVEYING, DRAWING AND ASSAYING,  
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A. VAN DER NAILLEN, Principal.

Send for Circular.

E. BUETTNER, C. E.

Mining Engineer.

MINING PROPERTIES EXAMINED  
AND REPORTED ON

FRISCO, BEAVER COUNTY, UTAH.

WIRE BOUND



BOILER COVERING

Wire-Bound Asbestos Boiler Covering and Agent for

Reed's Boiler and Pipe Covering,

BRANCH OFFICE: 22 California Street. OFFICE AND FACTORY: 314 Townsend St.

### AIR COMPRESSORS

PRICES REDUCED. SEND FOR NEW CATALOGUE.

CLAYTON STEAM PUMP WORKS

14 AND 16 WATER STREET, BROOKLYN, N. Y.

## COKE. PATENT. COKE.

This COKE is exclusively used by Prof. Thomas Price, in his assay office, by the Selby Smelting and Lead Co., Prescott, Scott & Co., Risdon Iron and Locomotive Works and others in this city. Large supplies are regularly forwarded to consumers in Salt Lake and Nevada, to the Copper Queen Mining Co., Longfellow Copper Mining Co. and other consumers in Arizona. The undersigned are in receipt of regular supplies from Cardiff, Wales, and offer the COKE for sale in quantities to suit purchasers.

BALFOUR, GUTHRIE & CO.,

316 California St., San Francisco.

## DEWEY & CO'S

Scientific Press



Patent Agency.

[ESTABLISHED 1860.]

Inventors on the Pacific Coast will find it greatly to their advantage to consult this old experienced, first-class Agency. We have able and trustworthy associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other Agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of Patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 202 Sansome St., S. F.

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IRVING M. SCOTT.

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## UNION IRON WORKS,

Office, 61 First St. | Cor. First & Mission Sts., S. F. | P. O. Box, 2128.

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### STEAM, AIR AND HYDRAULIC MACHINERY.

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Home Industry.—All Work Tested and Guaranteed.

VERTICAL ENGINES,  
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AUTOMATIC CUT-OFF ENGINES,  
COMPOUND CONDENSING ENGINES,  
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Office—127 First Street, San Francisco, Cal.

### Builders of Engines, Boilers, all Classes of Machinery.

PLANTS FOR GOLD AND SILVER MILLS,

Embracing the latest and most Improved Machinery and Processes for Base and Free Ores.

WATER JACKET SMELTING FURNACES.

For both Galena and Copper Ores of the Most Improved Construction.

Having Built nearly every successful working Furnace on the Coast, we are prepared to guarantee the best results attainable in all classes of Ores.

HOISTING AND PUMPING MACHINERY,

Embracing all Known Improvements.

WHEELLOCK'S AUTOMATIC CUT-OFF ENGINE.

Beyond Question the most economical and perfect working Engine now made.

WALKER'S COMPOUND STEAM PUMPS.

The best in use. Will work with thirty per cent. less steam than any other Pump in the market.

Sole Agents for HOWELL'S IMPROVED WHITE FURNACE.

The only successful Chloridizing Furnace made. Over fifty of them in use on this Coast.

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## William Hawkins,

(SUCCESSOR TO HAWKINS & CANTRELL).

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### IMPROVED PORTABLE HOISTING ENGINES,

FOR MINING AND OTHER PURPOSES.

Also of the HAWKINS' PATENT ELEVATOR HOIST, for Hotels, Warehouses and Public Buildings.

### Steam Engines and all Kinds of Mill and Mining Machinery.

L. C. MARSHUTZ.

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## National Iron Works.

Northwest Cor. Main and Howard Sts., San Francisco.

MANUFACTURERS OF

### IMPROVED PORTABLE HOISTING ENGINES.

Stationary and Compound Engines, Quartz Crushing and Amalgamating Machines, Flour, Sugar and Saw Mills.

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Kendall's Patent Quartz Mill, National Ore Feeder & Concentrator.

CASTINGS AND FORGINGS OF EVERY DESCRIPTION.



Corner Beale and Howard Sts.,

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### Builders of Steam Machinery

IN ALL ITS BRANCHES,

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HIGH PRESSURE OR COMPOUND.

STEAM VESSELS, of all kinds, built complete with Hulls of Wood, Iron or Composite.

ORDINARY ENGINES compounded when advisable.

STEAM LAUNCHES, Barges and Steam Tugs constructed with reference to the Trade in which they are to be employed. Speed, tonnage and draft of water guaranteed.

STEAM BOILERS. Particular attention given to the quality of the material and workmanship, and none but first-class work produced.

SUGAR MILLS AND SUGAR-MAKING MACHINERY made after the most approved plans. Also, all Boiler Iron Work connected therewith.

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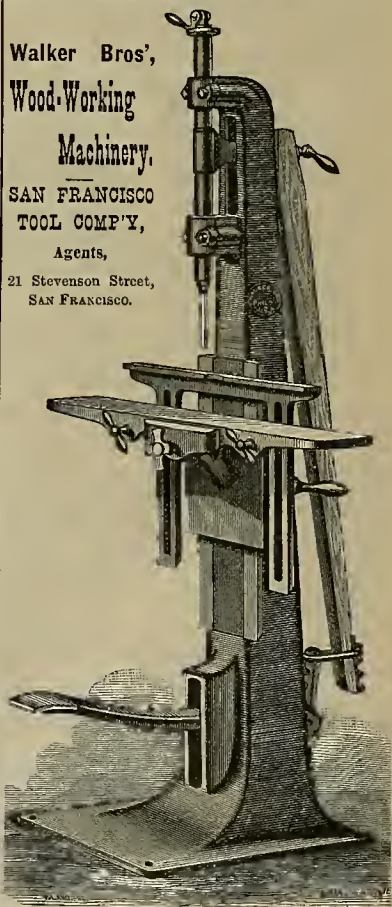
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Wood-Working  
Machinery.

SAN FRANCISCO  
TOOL COMP'Y,

Agents,

21 Stevenson Street,  
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J. W. QUICK, MANUFACTURER,



Several first premiums received for Quartz Mill Screens, and Perforated Sheet Metals of every description. I would call special attention to my SLOT CUT and SLOT PUNCHED SCREENS, which are attracting much attention and giving universal satisfaction. This is the only establishment on the coast devoted exclusively to the manufacture of Screens. Mill owners using Battery Screens extensively can contract for large supplies at favorable rates. Orders solicited and promptly attended to.

32 Fremont Street, San Francisco.

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Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of the MINING AND SCIENTIFIC PRESS, San Francisco, at favorable rates.

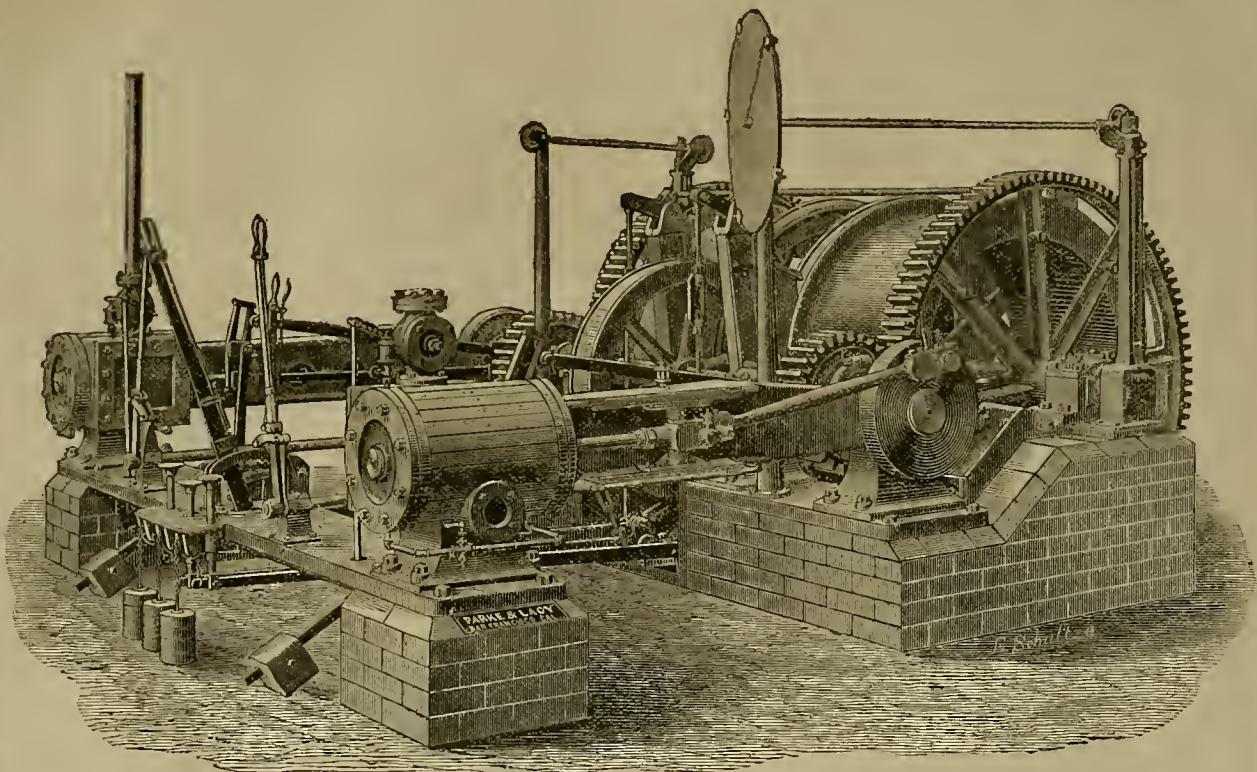


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Rock Drills, Air Compressors—Burleigh's  
Machinist's Tools—Putnam's.  
Vertical Isochronal Mining Pump—Cope  
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Plunger Pumps—Cope & Maxwell.  
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Improved Blowers—Baker & Root's.



Pressure Blowers—Sturtevant's.  
Inspirators—Hancock's.  
Hoisting Engines—Miles.  
Fire Extinguishers—Babcock's & Cham-  
pion.  
Chemical Engines—Babcock's.

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Leflet's Double Turbine Water Wheel.

PAIR "12 X 18" DOUBLE GEARED HOIST.

**WOOD WORKING MACHINERY, MANUFACTURED BY THE H. B. SMITH MACHINE COMPANY,**  
**And HAZARD STEEL Ropes and Cables.**

The Undersigned are Agents for, and  
are Prepared to Furnish Prices  
and all Particulars for

**THE BALDWIN LOCOMOTIVES,** every  
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In witness whereof we have hereto set our hands this  
First Day of April, A. D. 1881.

**GEORGE SPAULDING,**  
**DWIGHT GERMAIN**  
Duly acknowledged, June, 4th, A. D. 1881, before Sam'l S.  
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Endorsed—Filed May 8, 1881.  
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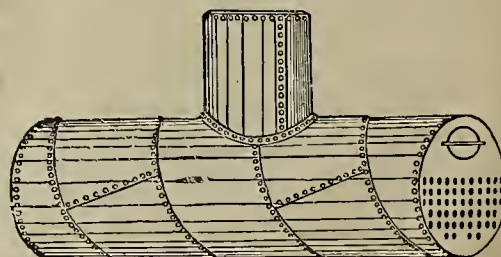
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# MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,  
Publishers.

SAN FRANCISCO, SATURDAY, JUNE 25, 1881.

VOLUME XLII  
Number 26.

## Foundry Notes.

The foundries of the city are generally pretty busy just at present, and all of them have more or less large work on hand. It is a noticeable fact that orders for mining machinery have lately come to this city from Colorado and Montana. Considerable machinery has been shipped to Montana, in the shape of mills, hoisting works, furnaces, etc. One foundry alone has sent \$30,000 worth of machinery to Montana recently. Smelting furnaces and hoists are also being sent to Idaho. As to Colorado, it has been generally supposed that we are too far off to receive any orders from there, but the excellence and superiority of the mining machinery made at our foundries cause orders to come here. A lot of amalgamating machinery went from here to Colorado this week. At the

## National Iron Works.

They are just completing a locomotive for the Empire coal mine and Railroad Co. to use on their narrow gauge line. It is a six-wheel, connected tank style, the same as built by the Baldwin Locomotive Works, of Philadelphia. This engine will weigh in working order, about 35,000 lbs. It is strongly and substantially made and will be finished handsomely. These works are also building three locomotive motors for the Presidio Railroad Co. Each of these engines will weigh about 16,000 lbs., in working order.

The works are manufacturing a hydraulic oil press for the firm of Haycock, Tallant & Colton, in this city. They have also just shipped three portable mining hoisting engines, of the peculiar popular type made by them. They have shipped to La Gata mining company, at Julian mining district, San Diego county, one of Kendall's one-stamp quartz mills and three of these mills have been shipped to Honduras, for the Honduras or New York and Rosario mining company.

An engine and boiler for a flour mill in Mexico was shipped by the last steamer, as was also the gearing, etc., for a cotton mill at Tepic, Mexico.

## Parke & Lacy.

Though not actually in the foundry business, they have made to their order a large amount of mining machinery in this city. They have just supplied to the Tehuantepec Inter-Ocean Railroad Co., the first of its outfit for the beginning of the work on the line. This consisted of Burleigh air compressor, large Burleigh drills, hoisting engines, etc. These articles were shipped to Salina Cruz. The company is employing natives on its work, but Parke & Lacy sent men down from here to take charge of the machinery.

**QUARTZ MILL IN CALISTOGA.**—A quartz mill is being constructed in Calistoga, calculated to reduce by dry process 20 tons of ore per day. Dodge's pulverizer is to be used, with grinding pans and settlers. Many tons of ore, assaying well, it is said, are waiting on the dump on St. Helena mountain, some four miles distant. If successful gold or silver mines are here developed (in the Coast Range), it will be a new and important fact to the world at large. We expect to further mention this mill when in operation.

**AT THE SUTRO TUNNEL.**—On the 11th inst., the water from the Combination shaft was turned into the new line of large boxes, and on the 12th inst. the drain boxes carrying the water from the north and south lateral boxes were connected with the large boxes. The drain boxes are now receiving from the Comstock mines over 4,500,000 gallons of water per 24 hours, and have a capacity to carry over double that quantity. The water has a temperature of 118°.

The Homestake mining company has declared a dividend of 30c per share, payable at New York on the 25th. From a 30-stamp mill in 1877, the company is now running 440 stamps. It now owns or controls the claims known as the Homestake, Father de Smet, Golden Terra, Giant, Old Abe, Deadwood and Highland,

## New Sinking Pump.

We illustrate on this page a new form of sinking pump for mining purposes, made under

mining pump, but arranged so as to be lowered down a shaft or winze by means of a wire rope, where it hangs while at work, as it does not need to be secured to timber or otherwise fastened in place. The benefit of such a pump will

tion where the men cannot work within 400 ft. of it. The pump is in a very hot place indeed. It has a 12x18 steam cylinder, and a 7x18 plunger, with a capacity of about 20,000 gals. per hour.

The weight of the pump is about 3,400 lbs., and its own weight will keep it in place all right. It is hooked on and lowered right down. The air or steam pipes, and the water pipes are made in equal lengths, so that they are simultaneously lengthened as the pump is gradually lowered. There is nothing movable on the outside of the pump, so there is no danger of its being broken. It may be run by compressed air or steam. Either rubber hose or iron pipe may be used for connection. The Cope & Maxwell pump is too well known, in the mining regions, as to details of construction and operation, to require any extended description from us.

## Safety Attachment for Mine Cages.

Douglas Brown, of Prescott, Arizona, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a new form of safety attachment for safety cages. It consists in the employment of inclined arms having their outer ends formed to engage and hold on the guide timbers between which the cage moves, while their inner ends are connected with a ring secured to a vertically-sliding spindle or king-bolt having springs to draw it down forcibly if the rope breaks, and thus cause the ends of the inclined arms to engage the guide timbers. As soon as these arms become engaged and fixed in the guides, the whole weight of the cage is transferred to the king-bolt by which it is suspended, and through it a direct power is exerted to fix the arms in the guides independent of the spring.

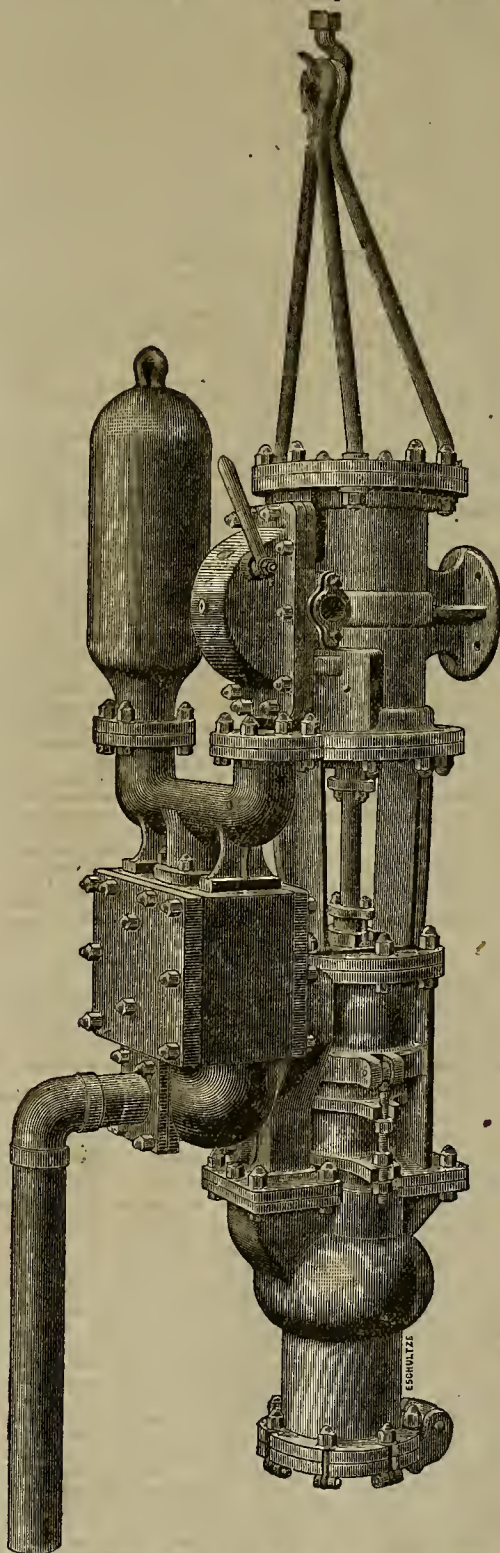
A sliding ring or sleeve upon the king-bolt below the attachment of the inclined arm, is connected with them by stay, or bracing arms which cause both the arms to be thrown out simultaneously, and equally prevents them from being thrown out too far by the shock, and assists in strengthening and bracing them. The frame of the cage has clips which extend upon each side of the guide timbers, where the safety arms will engage them, and thus prevent the timbers from being split by the arms when they are forced into the timbers. Rubber buffers or springs below the nut at the top of the king-bolt relieve the jar when it springs up on the catches, and the platform or floor may be also supported upon springs to relieve the force of the blow.

SUIT has been commenced in the Superior Court by N. Gregovich against the Tilden M. Co., A. J. Ralston, F. Locan and W. M. Buoker, to set aside an election of defendants as Directors of the company. The complaint alleges that no by-laws were ever passed or adopted by the corporation, or the stockholders thereof; that on the 7th of June, 1881, persons who claimed to be stockholders of the company held an election for Directors. At that election defendant Ralston voted 33,208 shares of the company's stock for himself, Locan and Buoker; that 49,950 votes cast by Ralston were based upon 49,950 shares of the capital stock, and were accumulated and were distributed for the defendants, Ralston, Locan and Buoker, in accordance with section 307 of the Civil Code; that said Ralston had no right to vote more than 200 shares; that plaintiff held and was the owner of the 49,950 shares of stock voted by Ralston.

The Copper Queen mining company, of Arizona, incorporated in New York, April 2, 1881, has declared a monthly dividend amounting to \$25,000, or 10 cents per share, payable July 1st. This is the first dividend.

A DISPATCH from Tombstone records the development of a large ore body in the Tombstone mine. Some of the ore runs as high as \$12,000 per ton, and it is estimated that the ore in sight is worth \$1,250,000.

It is rumored that the Jennie A mine, White Pine, has been sold to English capitalists for \$250,000.



NEW SINKING PUMP FOR MINING PURPOSES.

the Cope and Maxwell patent, but from a design by Parke & Lacy, agents in this city, who devised its peculiar arrangements to meet a demand on this coast. It is a vertical plunger

he recognized when it is stated that the pump from which the photograph from which the engraving was made, is now at work on the Yellow Jacket mine, on the Comstock, in a posi-



## CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—E.S.

### Wood River Mines.

(From our Traveling correspondent.)

Some of the rich Mines and Fine Prospects.

To the north of Croy's gulch and about six miles west of the town of Hailey, is the finest group of mines yet discovered in this famous district. The formation here is lime, with granite on the north, and quartzite on the south, and a quartzite lead of from 20 to 100 ft. in width, running through the middle of the lime belt. The general course of this belt is northwest to southeast. The galena ledges have been found on one side or the other of the quartzite lead and sometimes under it, in which latter case the croppings are of a peculiar dark color, supposed by experienced miners to have been caused by fumes arising from the lead underneath.

Some of the ledges do not crop out on the surface, making

#### Prospecting a Difficult and Tedious Task.

Where croppings are found they are composed of oxide of iron, lead and quartzite. The ore is sulphide of lead (galena) with here and there some carbonates. The leads vary in width from a few inches to 15 ft., although the average width of the pay ore cannot be put at from more than 18 inches to two ft., in those mines which make the best showing. Mr. D. C. Coleman, who is a pioneer prospector in this district, says that he has not seen any galena ores that assayed less than 85 ozs. in silver, and a great many samples that went as high as 2,000 ozs. The average amount of lead contained in this ore is 65%. Considerable iron runs with the galena as gangue and is said to make excellent flux for smelting.

The mines in the immediate vicinity of this town of Bullion are too numerous to mention. The belt throughout this entire limestone belt are

#### Staked Out for Miles

With poets and monuments, so that they now resemble Lone Mountain Cemetery. Wherever iron croppings penetrate the surface is found a stake and notice, but in a majority of cases nothing else has been done. The Mayflower and Bullion did not measure more than two or two and one-half inches in width where the discovery was made, but the former has already attained a width of seven ft. between the walls, at a depth of 75 ft. below the surface. In the Bullion, at a depth of 160 ft., are found two or three different pay chutes, varying from three to 20 inches each, with iron and ledge matter intervening. The ore at this depth will assay as high as 3,000 to 4,000 ozs., being mostly pure chloride of silver, but for reasons best known to the owners very little of this kind of ore finds its way to the surface.

There is a tunnel 180 ft. in length, and a shaft 160 ft. in depth, with a number of drifts and stopes in ore that seems to improve from day to day. Both the Bullion and the Mayflower belong to Salt Lake parties, and are under the superintendence of Col. E. A. Wall. About 70 men are now at work, principally in constructing roads to enable machinery for bolting works to be taken to the mines.

The Jay Gould, situated due north of the Mayflower, was sold a few days ago to Warren Hussey, and associates, for \$60,000. This mine has also produced some very high-grade ores, but was very badly handled by parties who worked it under a lease.

About one mile east is the

#### Idahoan Lode.

In a contact of lime and quartzite, with the usual iron croppings on the surface. Last year it shipped 142 tons to Salt Lake, which realized \$128 per ton after deducting all expenses for mining, sacking, freight and smelting. The vein varies from five ft. in the open cut near the mouth of the tunnel, to 15 in. in the narrowest places. There is a fine ledge of pure galena, and another one of carbonates, that runs from 47 to 160 ozs. in silver. About 200 tons of ore have been extracted this year, some of which still awaits shipment.

There is a tunnel, 200 ft. in length, running in solid ore; and 40 ft. east of the tunnel is an open cut, 22x45 ft., from which a 50-ft. shaft has been sunk on the ledge. Ten men are now engaged in taking out ore or cutting timbers.

One-half mile from Bullion, in a northwest direction, are two excellent prospects, known as the Bay State and Silver Pass, belonging to D. C. Coleman. The Silver Pass is 12 in. wide on the surface, and can be traced for 200 ft., in a contact of lime and quartzite. Two men are now at work running a tunnel to tap this ledge, which they expect to do at a depth of 50 ft. The Bay State has been stripped for 30 ft., exposing the same kind of vein. Experienced miners say that these surface indications are far better than those of the Bullion or Mayflower, but unfortunately it will require more capital than the owner is possessed of to open up the ledges in proper shape. One mile farther on in the same direction are what is known in this vicinity as the Frenchman's mines, the Chicago and its extension, which have just been bonded for \$1,200.

#### The Altitude

Of nearly all the mines about Bullion is over

7,000 ft., and the hills are very steep, making it anything but easy to get around except on the back of a mountain goat.

About three-quarters of a mile west of Wood River, and two miles below Hailey is the Star, discovered by Zach. Hayes, in the fall of 1879, and sold to A. Wolters, E. S. Chass and David Falk, of Boise City. It is a contact vein, lying between syenite, or hornblende granite on one side and lime on the other, with a pay streak varying from a few inches to three ft. in width. The ore is argentiferous galena, of very high grade, and in the west shaft, rich carbonate ore is found that assays 740 ounces. A sample of five tons of the former was sent to Salt Lake, where it showed 184½ ounces silver, and 60% lead. The ledge can be plainly traced a distance of 800 ft., and in some places solid galena may be found on the surface. The developments on this mine consist of a 280 ft. tunnel, and a winze started 156 ft. from the mouth of the tunnel and raised to the surface. One shaft has been started 440 ft., and another 730 ft. above the tunnel. The first is now down 67 ft. and the other 50 ft., all showing splendid bodies of ore. As no crosscutting has yet been done, the width of the ledge is still unknown.

Messrs. Wolters, Falk and Lieut. F. J. Pat-ten, U. S. A., have also

#### Erected a Smelter

On the east side of Wood River, about one and one-half miles above Hailey. It has a Fraser & Chalmers' four tuyeres furnace, with a capacity of 15 tons of heavy galena, or 25 tons of carbonate ores. The blast is furnished by a Root blower, and the machinery is run by a Loeffel's turbine wheel, having a 24-ft. head of water. The flux used is pure calspar and hematite, or red oxide of iron, which is obtained at a distance of 18 miles. The charcoal costs them from 20 to 22 cents per bush., delivered. This is the pioneer smelter on Wood River, and will be started up in the course of a few days.

I have just been shown, by Mr. Emil F. Gaetz, specimens of some kind of asphaltic or

#### Bituminous Mineral

Strongly resembling coal, which he has found in a large bed two miles south of Silver creek. The bed is 60 ft. wide and can be traced for three miles, with fire clay, 6 to 8 ft. in thickness, on the north, and porphyritic slate formation on the south side. The mineral, whatever it is, looks very much like bituminous coal; colors brown and crumbles up when heated and appears to contain bitumen. Should it prove to be coal it is a very important discovery, but its close proximity to the lava formation seems to dispel all hopes in that direction.

A. L. M.

### Volatilization of Gold.

EDITORS PRESS:—Your urbane correspondent, Mr. Herbert Lang, who, in his first paragraph, pays me the compliment of calling me a "distinguished author," and in his second implies a doubt of my veracity, or my sanity, questions the sufficiency of the evidence on which I have affirmed the volatilization of gold in the roasting of certain ores with salt. (Vide pages 121-4 Leaching Gold and Silver Ores).

It strikes me that Mr. Lang has read your extract from my book somewhat hastily, as he confounds the "yellow sublimate" with the "fluffy sublimate." Certainly, I should think he has not read the book.

I regret to say that no sample of either of those substances was preserved, and I was too busy at the time to make any further examination of them than sufficed to prove their richness as stated.

Had Mr. Herbert Lang read my book he would not need to ask how I knew that "the material could be roasted with little or no loss if no salt was used, because some assays had been made in that way." He would have read, in the article on "Assaying Concentrations," that I disapprove, in general, the practice of roasting the assay, and give several methods of assaying sulphurets without roasting; consequently he would have inferred my meaning, which was that nearly as high results were got from assays which were roasted (without salt) as from those which were not roasted. Of course there might be a loss in assaying by any method, but as that has not been proved it cannot be considered. The roasting of two one-half-ounce samples alone would certainly be a slender basis on which to establish a hypothesis, but, taken in connection with the other evidence, it, to my mind, clearly established a fact. Mr. Lang says, "it is a curious fact" that no one has previously discovered the demoralizing effect of salt in gold assaying." In reply I would ask, who ever uses salt in gold assaying, except as a covering for the assay, in which case its action is totally different from that produced when the ore is roasted with salt before being assayed? I attribute the loss of gold in roasting with salt, when the salt is added early, not to the direct action of the salt, but to that of volatile metal chlorides produced in the roasting.

I am further inclined to attribute the effect to the copper chlorides more particularly, because I have observed that concentrations which did not contain more than a trace of copper did not suffer a loss in roasting, with even 10% of salt charged with the ore. I have not, however, established the fact that copper was the cause.

The "peculiarity" referred to by me con-

sisted simply in the fact that the ore sustained such a large loss, in which it appears to have been peculiar. Since writing the book I have seen an analysis of a sample of the ore, which showed "traces" of selenium and tellurium.

The "expert metallurgist" alluded to is well known to be such, and it would give me pleasure to mention his name in this connection, but that I fear it might not be agreeable to him, as "reduced circumstances" had induced him, much to his credit, I thought, to seek employment with me as a common furnace hand, rather than as a hurden on his friends. He left me before I discovered the cause of my difficulty, and is now, I am happy to say, in a position more worthy of his talent. I hear he is as incredulous as Mr. Lang himself on the subject of the loss of gold.

The sulphurets referred to were those of the Murchie mine in Nevada county. They had been tried by several well-known operators, in Nevada and San Francisco, whose failure to work them successfully was the reason that a contract was given to Aaron and Irelan.

After the expiration of our contract, I visited Nevada, and Mr. Crosby remarked to me that those sulphurets lost gold by being roasted with salt. I did not inform him as to how I had succeeded in preventing the loss, but he made the discovery for himself, and, having the freight and other advantages in his favor, has since worked them in a similar manner, and with as good results as I did. I have no doubt that Mr. Crosby as well as G. P. Dutkin, M. E., will endorse my statements as to this ore.

If my memory is not at fault, Kustel says, in one of his earlier works, on the authority of Plattun, that there is no sensible loss of gold in roasting sulphurets, unless the operation is unduly hurried, adding that the addition of salt makes no difference. In his later edition of "Roasting of Gold and Silver Ores," he repeats this statement in one place, but, in another, states, possibly in reference to the Murchie ore, that some operators have complained of a heavy loss of gold in roasting certain ores with salt. [If I am in error Mr. Kustel will please correct me.]

The evidence upon which I have affirmed the volatilization of gold in this case is as follows:

Some ten carloads of sulphurets were roasted with from 1% to 2% of salt, charged with the ore. The assays of tailings indicated a yield of 90% or over, but the gold collected fell considerably short of 85%. This discrepancy was proved not to be due to losses in the leaching department.

The roasted ore assayed lower than the raw, whereas the reverse ought to have been the case. The enblimates deposited on the outside of the furnace under a low draft, and that in the fine, were rich in gold.

After the manners of applying the salt was changed, as described in my book, the assays of tailings as compared with those of the original ore corresponded with the amount of gold collected.

The roasted ore assayed higher than the raw sample, by an amount corresponding to the loss of weight. A half-ounce of the ore, roasted with 4% of salt, yielded, when smelted, about 50% less than another half-ounce roasted without salt. Mr. Crosby found that the ore lost gold when roasted with salt in the usual manner, and several experienced operators failed in working it to a good result.

Under the first system of roasting we lost money on our contract, and the missing gold was not in the tailings; under the second we realized a good profit with richer tailings.

It would certainly be interesting to know in what form the gold was carried over. My book being merely a practical handbook, I used the term volatilize in its literal sense, as flying away, which certainly the gold did, whether in the form of a gaseous compound, or as metal in minute particles.

In conclusion, I will say I still have some samples of the "very remarkable substance" in question, which I shall be happy to place at the disposal of any gentleman who may desire to experiment upon it, on condition of his publishing the results in your paper. C. H. AARON.

### Experiments in Chlorination.

EDITORS PRESS:—Recently a trial lot of concentrations from the Atlas mine, Tuttle town, Tuolumne county, was subjected to roasting and chlorination at the Golden Gate mill, near Sonora. The ore from which these concentrations were derived consists wholly or partly of cubic pyrites, contained in a matrix of dolomite, the carbonate of lime and magnesia, as shown by my analysis. The result of roasting in the reverberatory furnace, at a light red heat, of such ore, is easily foreseen. While the pyrites are satisfactorily desulphurized, as invariably occurs under the intelligent supervision of the managers of the above works, some of the carbonic acid, united with the alkaline earths, is also driven off, and caustic lime or magnesia, or both, are the result. As might be expected, in dampening, the alkaline earths are converted into hydrates with an increase of bulk. The consequence of the "slaking" is that the mass solidifies in the vat, and becomes not only impervious to the chlorine gas, but nearly so to the tools used in removing the mass. On the other hand, the chemical reactions between the hydrates and chlorine are such as to preclude the formation of gold chloride until the more powerful affinities of the lime and magnesia are neutralized.

The process is certainly an effective one if bleaching powders be desired, but as far as the profitable extraction of gold is concerned, the valuable metal might as well not be present. No doubt this result, which should have been foreseen, will put a quietus to the rumor of the intended erection of chlorination works at the Atlas mine.

HERBERT LANG.

### Reduction Facilities.

Not long since an article appeared in these columns, setting forth the advantages obtained by prospectors, and owners of small mining properties brought about by the Carson and Colorado railroad. The Lyon county Times of recent date has an item descriptive of the mill at that place and its crushing facilities. It further says it is just now an object of interest to our people. It is employing 100 men and gives promise of a large business in the near future. It, apparently, is to be the regenerator of the early business prosperity of Dayton. And in consequence of this, a brief history of the mill may be interesting to our readers. The mill was built in 1865 by Mr. Fred. Birdsall in company with Mr. Carpenter. The first building erected cost \$106,000. Shortly after an addition was made, costing \$100,000, making the entire cost \$206,000. It was built as a quartz mill, having 30 stamps. It started up on Chollar ore, and afterward worked ore from the Occidental and other mines. Its best run was 2,700 tons of Occidental ore in one month. It ran about four years on ore, working over 68,000 tons. In 1870 it was changed to a tailings mill, and has averaged since then 50,000 tons per year. Its best run on tailings was 90,000 tons in one year. It is claimed that no other mill on the Pacific coast can show as much work accomplished. A reporter of the Times had an interview with Mr. Birdsall, the principal owner of the mill, last Thursday and learned from him the following: The company are now purchasing all the ore they can secure. In case they obtain a sufficient amount they will at once put in 30 stamps and engage in the business of ore crushing. They do not propose to do any custom work, but will purchase at a certain per cent. of assay value all ore offered. A smelting furnace will be built as soon as it is shown that sufficient paying ore can be obtained. The company will have a wood drive of 4,000 cords here in two weeks. In future they expect to use 5,000 cords per year. Mr. Birdsall and Superintendent Scott started out on a business tour the other day. They will visit Hawthorne, Belleville and Candelaria with the purpose of ascertaining, in a measure, the amount and quality of ore that might be obtained from those localities. We believe Dayton is on the eve of a grand business boom.—True Fissure, June 11th.

### Industrial Progress.

The largest cotton seed mill in the world is now in process of erection at Little Rock, Ark. It will work up 300 tons of cotton seed daily.

It is estimated by good judges that the mills of Minneapolis will grind the present year 20,000,000 bushels of wheat. The increase in milling capacity has been growing every year, but at no period so fast as at present.

The Director of the Mint estimates the total gold circulation at \$520,000,000, of which \$246,000,000 is in the Treasury.

The Agricultural Department estimates that 4% of the acreage of Texas can produce enough cotton to supply the whole world.

#### Foreign Industrial Notes.

In India there are 1,500,000 laborers engaged in the cultivation of jute, where it is spun in nearly every cottage. With our millions of acres well suited to jute culture, we ought to do a thousand times better than that, without becoming Indians. The fact is that jute culture and manufacture are two of the great prospective industries of our time and country; and the sooner the prospective becomes the realized the better. California is already moving in the matter.

The depression of agricultural interests in Great Britain is a more serious danger than the threatened approach of the combined armies of Europe or the disturbances in Ireland.

Eight factories in Tarapaca, Peru, produce annually 350,000 pounds of iodine. Three other factories are being constructed. The iodine is extracted from the waters of salt-petre.

The Chinese have 6,982 ocean vessels, with an aggregate tonnage of 4,353,696 tons.

Foreign financiers say that the gold exportation has very little effect on business.

A NEW WHITE LEAD PROCESS.—The production of white lead has given rise to various processes and improvements, one of the most recent of the alleged improvements in this line being as follows: Very fine ground litharge is subjected, in a mixing vessel, to a salt brine, by the action of which chloride of lead and caustic soda are produced. This mass is then run into an iron vessel, into which carbonic acid is pumped, causing a further chemical change in the production of carbonate of lead and common salt once more, and the latter, being washed out from the white lead, may be used over again in the first operation. It is stated, however, that though the article produced in this way is very white and chemically pure, it is somewhat less heavy than that made by the old process.



## MECHANICAL PROGRESS.

## Anomalous Action of Leather Belts.

According to the latest experiments of Mr. Samuel Webber, of Manchester, N. H., with leather belts, the following apparent anomalies were demonstrated by actual experiment: The belt developed in each case 90° of angle of the pulley-face, and was three inches wide. An old belt, moist, would hold on an 18-inch pulley 12½ lbs.; the same belt, drier, on a 24-inch pulley, 9½ lbs.; an new belt on a 24-inch pulley, 9½ lbs. These belts held in each case 2½ lbs. on one end, and at the other as much weight as was possible without slipping. Hence, the tension may be taken as equal for each case.

How does it happen that an old belt on an 18-inch pulley will drive 30% more than the same belt a little drier will drive on a 24-inch pulley? Why is it that a new belt on a 24-inch pulley drives, in these experiments, 33% less than an old belt on an 18-inch pulley? Where is the lost power due to bending belt more on the small pulley?

If, as some assert, the condition of the belt makes 30% differences in its driving power, if putting the grain aside instead of the flesh side to the pulley makes another 30% difference, what is the driving power of a belt calculated by a pocket-book formula, which quietly ignores their existence as factors altogether?

There seems to be an anomalous action here, unless we have overlooked some element which we do not now discover. Belts are very perplexing in their action in many instances, and this is not simplified by the diverse views which are held regarding them.

Another set of experiments, made by M. Lelontre, also furnish some further anomalous facts on the transmission of power by belts, described as follows: While the elongations or successive increments of length become less and less up to a certain load, they then become greater and greater, showing a point of maximum power of resistance which is then followed by a falling off. After this decline of resistance the elongation again becomes less rapid up to the breaking strain, on approaching which the resistance is generally greater. Practically, in the case of ordinary leather, the maximum resistance to stretching is met with at a strain of about 550 lbs. per square inch, while in India-rubber and webbing it occurs at rather a lower strain, the fact appearing, therefore, that the working strain on a belt should be fixed as near as possible as that to which the maximum resistance to stretching is known to occur.—*Journal.*

## American Mill Machinery in Europe.

The editor of the *Chicago Times* at London writes that the exhibition of mill machinery, which opened in that city a short time since, comprised over 100 exhibits, among them several from America. Plant's apparatus excited the greatest attention among practical millers, but more especially among the London newspapers, many of which never mention the United States except under the most extraordinary circumstances, when they cannot possibly avoid it. Such is the superiority of American machinery that great alarm has been created among English millers, many of whom have on exhibition old-fashioned millstones under the impression that they are the most modern improvement. The journals point to this superiority as the reason why Americans are able to come into the English market and sell better flour at a lower price than flour made by British millers. The importation of flour has grown from 6,000,000 cwt. in 1875 to nearly 11,000,000 cwt. in 1880, of which 7,000,000 cwt. came from the United States. The *London Times* comments on this increase as a startling fact, and says there is every indication it will continue to increase in the same proportion. The *Times* adds, after commenting on the superiority of the American system of milling and the number of mills in operation, that "on all sides the aspects of the situation are serious. English millers look with apprehension to the not very distant time when the vast imports from the United States may be mainly, if not wholly, flour instead of wheat. A most significant feature of the stride made by Americans toward eclipsing all Europe is the quality of their flour. The economy and perfection of their grinding, warn English millers that their success depends on the lessons they obtain at the present exhibition, and the uses to which they put them."

**A DANGEROUS PRACTICE.**—The dangers of meddling with defects in steam-boiler fittings, or with leaks, when pressure is on, are not fully realized by a great many. If plugs leak, or seams want calking, it is not safe to do it until the full working pressure is used. Wait until night, or better still, take time by the forelock, and as far as possible keep ahead of such contingencies by repairs at the proper time. The engineer of a portable mill at Aldrich, Minn., recently undertook to stop a leak in the boiler by screwing up a plug, which blew out into his face. Being on his breast under the boiler he was unable to escape, and was so badly scalded that he died on the following day. While calking a boiler at Easton, Madison county, N. Y., E. S. Vine was seriously scalded about the head and chest by escaping steam.—*Mechanical Journal.*

## The Hammer.

Taking as its text the ancient legend of the Mechanics' Associations, "By hammer and hand, all arts do stand," the *Economist* pays the following glowing tribute to this implement of industry:

The hammer is the universal emblem of mechanics—those skilled in uniting and binding together of materials. With the hammer are alike forged the glittering sword of contention, and the dusty plowshare of peaceful agriculture. Its workmanship ornaments the trapping of war, and nails the olive branch of peace above the gate. In ancient warfare it stood pre-eminent, apart from the instruments it wrought and formed. The old hattering-ram of the Greeks was nothing but the rude conception of a huge hammer. In heathen mythology it was always the symbol of might and strength. It was the sole weapon of the dreaded god of thunder, Thor, the mighty rival of Odin. His hammer was fashioned by cunning dwarfs, and possessed the wonderful property of returning to his hand after being hurled. To the heathen of Teutons the sign of the hammer was analogous to that of the golden cross of Christianity. In the hammer lies the wealth of a nation. By it are forged the ponderous engines that almost shake the world, and the tiny needle which unites alike the costly silks and satins of a queen, and the rough homespun of a laborer.

The hammer, too, is no partisan. It is an instrument of the savage and the civilized. Its merry clink points out the abode of industry and labor. Its handle if extended, inviting all to grasp, and with its unyielding head, by the help of a strong arm, forges happiness and prosperity. It is, in fact, a domestic deity presiding over the aspirations of wealth and ambition. Not a stick is pointed, not a house is built, a ship floats, or a carriage rolls, or a wheel spins or an engine thunders; not a press speaks or a hagle peals, a spade delves or a hammer floats, without having endured the blows of the hammer. So it instructs and teaches us that great ends and large results can only be accomplished by good, hard, vigorous blows. That if we would attain usefulness, and reach the full perfection of what we are capable of becoming, we must not shrink back from the hardships, buffetings and hard knocks of life, but early learn to cultivate the power of patient endurance.

**SAND IN WELDING.**—A correspondent of the *Blacksmith and Wheelwright* writes: "I wish to say a few words with respect to the use of sand in welding. The question seems to be shall we or shall we not use sand in making welds. I consider it a very essential point in working steel, and use a composition which I prepare as follows: Take a quart of quartz sand, one pint of common salt, one pint of pulverized charcoal, half a pound of horax well burnt. These I mix well together in a sand box, and consider the preparation much better than raw borax for working steel. In working iron I omit the horax from the compound. It is the best thing I ever used in facing hammers; and right here let me say a word about facing hammers: I draw out a piece of cast steel about one-quarter inch square, draw out the end to a square point and cut it off about one inch long. I make enough of these points to cover the face of my hammer. I then drive up my old hammer square on its face and take a square, sharp punch and punch as near the edge as practicable, and drive the pointed plugs in the hammer as fast as I punch till I fill the face. Drive them in till they project but half an inch, and then weld solid with light blows, first with hand hammer and follow with the sledge. Dress up and temper a light straw color."

**STEEL.**—The *Boston Journal of Commerce* objects to the very miscellaneous application of the term "steel." The "low steel," "mild steel," "Bessemer steel," and other names by which partly converted iron is known, ought not to be called "steel." The name is a misnomer, and it has recently been earnestly advocated at a meeting of manufacturers in England to propose and introduce a new nomenclature which should more definitely designate the different qualities of iron in its commercial form to steel in its various grades, and as adapted to various uses. It would be well if such a recommendation could be universally adopted and generally acted on. At the present the public is greatly misled by the use of the term "steel," in designating the substance of which razor blades and railway rails, surgical instruments and steam boilers, pocket knives and Krupp's guns are made, as though the same material were used in one and all. Nothing could be more misleading. The steel plates of a boiler or ship's side have no more in common with the plate steel from which saw blades are formed than nickel has with copper. And many other illustrations might be given to show the great divergence of the same quality held in common, and the number of qualities not possessed in common by the material coming under the single denomination of "steel."

**A BLACKSMITH'S FIRE.**—A correspondent of the *Blacksmith and Wheelwright* inquires how he shall keep his fire in a small compass. He complains that clay or mortar soon burns out. The editor says in reply: "If he will mix them with a strong salt brine he will find this trouble avoided. When he requires an intense heat I suggest that he use fine coal wet up with the same. Use a thin coating on top and around the fire. Salt and sand mixed and thrown on top of the fire is also good for the purpose."

## SCIENTIFIC PROGRESS.

## Storage of Electricity.

## A Wonderful Alleged Discovery.

A correspondent of the *London Times* makes an announcement which, if fully borne out by the facts, is of the highest possible importance. He states that M. Camille Faure, a noted French scientist, has discovered a practical means of storing electricity and rendering it portable. It is almost unnecessary to remark that nothing of the kind has been possible heretofore, and that it has been regarded as being impossible to store up electric energy in a practical manner. At a recent public séance of the Société d'Encouragement pour l'Industrie, presided over by the president of the French Academy of Science and attended by many leading English scientists, the success of the discovery is said to have been demonstrated beyond the possibility of a doubt. A Faure battery was charged with the electric fluid direct from the ordinary Grove battery. The receptacle consisted of four Faure batteries, each about five inches diameter and 10 inches high, forming a cylindrical leaden vessel, and containing alternate sheets of metallic lead and minimum wrapped in felt and rolled into a spiral wetted with acidulated water, and the whole placed in a square wooden box, measuring about 1 cubic foot and weighing some 75 lbs. This was protected by a loose wooden cover, through which the electrodes (in lead) protruded, and were flattened down for convenience of transport. This box was handed to the writer of the letter in question, who left Paris on Tuesday night, arrived in London on Wednesday, and finally reached Glasgow, where the box was presented to Sir William Thompson.

That eminent man is now experimenting with the box in the laboratory of the Glasgow University, and will no doubt give the world the benefit of the results of his tests at an early date. There the matter rests at present, but if all this be true there is no doubt that we are on the eve of changes which will completely revolutionize many of our existing appliances and processes, especially as regards lighting and heating. This small box, measuring about one cu. ft., is said to contain a power equivalent to nearly 1,000,000 foot-pounds—a force, of which we can only speak comparatively, and without adequate knowledge of the resources of the plan on a larger scale. It is plain, however, that if electricity really could be stored and safely conveyed from place to place we might look upon the future of illumination, by that means, as being thoroughly and completely assured.

At present the great drawback lies in the circumstances that the generation of the electric force and the production of the light are quite simultaneous. When the machine stops, the light disappears, and vice versa. If, then, some means be devised to intercept and store up a portion of the whole of this force for subsequent use, the difficulty would disappear, and electricity will take rank as a handy, manageable and unequalled means of illumination. The mere supposition opens out a vista which cannot be successfully thought out or described, seeing that, for domestic, railway, mining, manufacturing and scientific purposes, the electric current would indubitably replace gas and all other illuminating media. Before counting these as accomplished facts, however, many economic and other points must be satisfactorily explained. The outcome of Sir Wm. Thompson's investigations will be awaited, therefore, with more than ordinary interest.—*Ironmonger, May 21st.*

## Later Advances.

A London special to the *New York Times* of June 11th, and written nearly three weeks after Mr. Thompson's attention was first called to the matter, says:—"The matter of storage of electricity by the use of the Faure battery has attracted the universal attention of the scientific men of Europe. As has been previously stated, William Thompson, the eminent scientist of Glasgow, lately took from Paris to Glasgow a Faure battery, supposed to contain a power to the amount of 1,000,000 lbs. to the cubic foot. After some weeks, Thompson makes a report, in which he announces the perfect success of the effort to store and transport the electric power. He has already ascertained enough regarding the qualities of the Faure reservoir to make it quite certain that it solves the problem of storing electric energy in a manner and upon a scale to render it useful in many important practical applications. Among other uses, enough can be stored to give light in a house for several hours without an additional supply. The reservoir can be moved easily and used where the dynamo-electric machines are unavailable. One great advantage to be found is in the fact that when this energy is supplied from a Faure reservoir it is always steady in delivery, thus preventing fitful oscillations in the light, experienced from the unequal action of the ordinary dynamo machines."

**A LUMINOUS TELEPHONE.**—Design and Work is informed that some one in Leipzig has invented a telephone which reproduces words in luminous characters, capable of being photographically recorded; but they state that they want to know very much more about this invention before receiving it with "our childlike faith."

## New and Curious Properties of Metallic Salts.

At the Physical Society of London, Prof. J. H. Gladstone exhibited, recently, an interesting experiment showing the crystallization of a metal upon itself from a fused salt. Dr. Gladstone and Mr. Alfred Tribe, in the course of some experiments on metallic replacements, observed that some sheet silver placed in fused silver chloride, became quickly studded with crystals of the metal.

The displacement of a metal by itself seemed so anomalous that they at first supposed the silver employed to contain impurities; but such was not the case, and they farther found iodide of silver could be substituted for the chloride with a like result. Moreover, when copper was immersed in fused cuprous chloride, zinc in melted zinc chloride, or iron in fused ferrous chloride, crystals of each of the several metals separated out. That this remarkable phenomenon was not due to a different physical condition of the rolled metals was proved by putting crystals of the pure metal, separated by electrolysis, instead of the rolled metal, when fresh crystals were formed as before.

Subsequent experiments went to prove that the effect is really due to an electric current set up in the cell by the unequal heating of different parts of the metal plunged in the salt. This contact current was proved to exist by means of a galvanometer, and the two following experiments intensified the electrolysis. Some silver chloride was fused in a hard glass tube and a rod of silver placed in it. On heating the under side of the lower end for ten minutes, a considerable crop of silver crystals was found in the cooler part of the liquid. Again, some silver chloride was fused in a crucible and one side more strongly heated than the other. Two rods of silver were connected together, one in the hotter and the other in the colder part of the salt. At the end of 15 minutes the latter was found studded with crystals, while the former was clean. Copper wires immersed in cuprous chloride gave a similar result.

## Ozone.

Ozone was discovered by Schonbein 25 years ago. He gave it the name of ozone, which means smell, because he first ascertained its presence in his laboratory by its odor, which is something like that of phosphorus, noticeable sometimes, immediately after very loud thunder and vivid lightning. Schonbein had observed the same odor some years before, in 1840, at the positive pole of a platinum battery, used in decomposing water by electricity, and the same afterwards in the slow combustion of phosphorus and ether.

The presence of ozone in the atmosphere may be ascertained thus: Starch a piece of soft paper or muslin and dip it into a solution of iodide of potash, then expose it to the air; it turns brown first, and, when moistened, gives various shades of a pinkish blue, more or less deep, according to the greater amount of ozone contained in the air; a scale has been made of 10°, showing the relative amounts of ozone, with the accuracy of a thermometer measuring the degree of heat or cold. The principal European chemists consider that a more accurate and sensitive test of the presence of ozone in the atmosphere is made by saturating strips of paper with the tincture of guaiacum.

If the air contains one fifty thousandth part of ozone, its odor is perceived, and yet so delicate is the test of the scale, that four degrees lower its presence is manifest. If one five thousandth part of ozone is in the air breathed, insects die, by being consumed—burned up; for, as oxygen is the great oxidizer in the universe, and ozone being an electric or more powerful or concentrated form of oxygen with greater freedom and perfectness, it may be considered the fire of fire to all insect life. Although so little ozone in the atmosphere is required for health, yet, as this proportion diminishes, epidemic diseases are sure to appear; this has been repeatedly noticed by scientific men, from which the inference may be safely drawn, that the less ozone there is in the air, the more full it is of that kind of life which corrupts the blood; while the larger presence of ozone destroys this life, and we say "the air is so pure and lovely."

**DOES IRON EXPAND ON PASSING FROM A LIQUID TO A SOLID?**—This question was discussed at the late meeting of the Iron and Steel Institute, of England. The discussion grew out of a paper read by Mr. Charles Markham, of Stavely, on "Experiments made to Determine Certain Physical Properties of Cast Iron." He stated that an opinion had long prevailed that molten iron, in passing from the fluid to the solid state, expanded after it had been cast and before it commenced to contract; and it had been frequently stated that the excellent impressions obtained from the most intricate patterns were principally due to this cause. He doubted whether cast iron when passing from a liquid to a solid state did expand in the slightest degree; and he undertook a series of experiments to elucidate this position. These experiments clearly proved that the reason why a piece of iron rose to the surface after it had sunk through a mass of molten iron was entirely due to the film of iron, which increased the volume sufficiently to enable it to float on the surface. His conclusion was that no expansion took place in cast iron after the metal had been run into a mold.



### Table of Highest and Lowest Sales in S. F. Stock Exchange.

Name of Company.	Week Ending June 2.	Week Ending June 9.	Week Ending June 16.	Week Ending June 23.
Albion	3.30	3.40	4.10	4.10
Alta	3.60	3.20	4.40	3.80
Andes	2.25	2.25	2.45	2.40
Albion	3.65	3.35	3.20	3.10
Argenta	3.00	2.50	2.00	1.50
Adelphi	2.95	2.85	2.65	2.70
Belcher	75c	75c	75c	75c
Best & Belcher	1.15	1.15	1.15	1.15
Bonanza	1.70	1.05	95c	85c
Bechtel	60c	1.05	95c	85c
Belle Isle	75c	75c	75c	75c
Bodie	75c	75c	75c	75c
Burlington	75c	75c	75c	75c
Butterfield	75c	75c	75c	75c
Boston	60c	60c	60c	60c
Black Hawk	20c	20c	20c	20c
Belvidere	20c	20c	20c	20c
Booker	25c	20c	20c	20c
Caladonia	25c	20c	20c	20c
California	2.10	2.15	1.85	1.55
Challenge	1.10	1.10	1.10	1.10
Chollar	3.10	2.10	2.10	2.10
Confidence	3.10	2.10	2.10	2.10
Con Imperial	25c	20c	20c	20c
Con Virginia	4.15	2.35	4.40	3.35
Crown Point	2.60	2.30	2.45	2.30
Cummins	20c	20c	20c	20c
Champion	20c	20c	20c	20c
Concordia	1.70	1.10	1.10	1.10
Concordia (Va.)	40c	40c	40c	40c
Con Pacific	1.80c	50c	25c	75c
Corcoran	1.45	1.10	1.10	1.10
Deer	1.45	1.10	1.10	1.10
E. M. Diablo	25c	20c	20c	20c
Eureka	32	31	32	32
Eschschuer	1.65	1.30	1.10	1.10
Endowment	1.65	1.30	1.10	1.10
Grand Prize	45c	40c	35c	30c
Golden Gate	2.40	2.05	2.25	2.10
Goodshew	55c	50c	45c	40c
Gould & Curry	95c	95c	95c	95c
Haystack	3.35	3.40	4.40	4.60
Head Center	1.10	1.10	1.10	1.10
Hussey	20c	20c	20c	20c
Independence	65c	65c	65c	65c
Justice	1.60	1.10	1.10	1.10
Jackson	25c	25c	25c	25c
Jupiter	25c	25c	25c	25c
Kentuck	2.10	2.10	2.10	2.10
McClintock	40c	40c	40c	40c
Lady Bryan	25c	20c	20c	20c
Lady Wash	25c	20c	20c	20c
Leviathan	25c	20c	20c	20c
Leadville	25c	20c	20c	20c
May Belle	25c	20c	20c	20c
Modoc	25c	20c	20c	20c
Manhattan	25c	20c	20c	20c
Martin White	25c	20c	20c	20c
McClintock	2.45	1.05	1.10	2.45
Mono	1.15	1.15	1.15	1.15
Mexican	1.15	1.15	1.15	1.15
Mt. Diablo	6.10	5.90	7.10	9.10
Morning Star	2.45	2.10	2.35	2.05
Mt. Pelee	1.90	1.85	1.95	1.80
Noonday	20c	15c	20c	15c
New York	20c	15c	20c	15c
Northern Belle	21.10	21.25	24.21	18.19
North Noonday	1.20	1.10	1.10	1.10
Navajo	1.85	90c	85c	70c
Oceano	1.20	1.40	1.10	1.10
Ophir	9.10	7.10	8.10	7.10
Original Keystone	1.15	1.15	1.15	1.15
Overman	80c	60c	55c	50c
Paris	50c	50c	50c	50c
Potosi	3.00	3.40	3.40	3.30
South Bulwer	10c	10c	10c	10c
Savage	4.35	3.55	4.00	3.70
Sig Belcher	61	8	6	7
Sierra Nevada	19.15	15.10	17.17	15.13
Sierra Hill	55c	10c	50c	35c
Silver King	22.10	22.10	22.10	22.10
Success	55c	55c	55c	55c
Summit	2.45	2.10	2.35	2.05
Scorpion	40c	40c	40c	40c
St. Silver	40c	40c	40c	40c
South Bodie	15c	10c	10c	10c
South Standard	15c	10c	10c	10c
Syndicate	40c	40c	40c	40c
Tucson	50c	40c	35c	30c
Tippecanoe	3.35	3.30	3.15	2.90
Tuscarora	25c	25c	25c	25c
Union	15.10	13.10	13.10	12.10
Utah	12.10	9.10	10.10	11.10
Wales	1.15	1.15	1.15	1.15
Yellow Jacket	5.10	4.10	4.45	5.10

### Sales at S. F. Stock Exchange.

Thursday A. M., June 23.		55 Scorpion.....1.70@17
350 Alta.....	3.10@30	300 Silver Hill.....25c
400 Andes.....	2.05	300 Union.....12c@12
650 B & Belcher.....	1.14@14	227 Utah.....11c@10
200 Belcher.....	3.30	160 Yellow Jacket.....5.05@51
120 Bodie.....	1.45	150 Alhambra.....2.10@21
120 Benton.....	1.50	200 Alhambra.....4.20@415
250 Con Virginia.....	3.40@33	400 Argenta.....15c
1475 California.....	1.55@15	500 Belmont.....85c@89
375 Chollar.....	2.70@26	250 Bechtel.....1.20@120
1350 Crown Point.....	2.65@260	550 Day.....2.10@210
160 Curtis.....	1.10	100 Grand Prize.....25c@250
150 Caladonia.....	1.00@10	40 Mt. Diablo.....9.10@91
100 Challenge.....	55c@55	470 Mono.....1.10@110
35 Eschschuer.....	1.35	10 Northern Belle.....19.15@1915
1010 Gould & Curry.....	7.10	150 Noonday.....1.10@110
75 Hale & Nor.....	4.35	250 N. Noonday.....70c
140 Justice.....	1.35	300 Oro.....75c@750
350 Julia.....	4.50	300 Star.....25c@250
150 Lady Wash.....	2.10	110 Silver King.....21.10@2110
360 Mexican.....	1.10@110	200 Sulphur.....3.05@305
150 N. Ex. Utah.....	1.50	150 Syndicate.....1.10@110
100 New Wells Fargo.....	35c@35	200 Bodie.....1.10@110
170 Overman.....	1.45@145	60 Tucson.....65c@650
315 Ophir.....	7.10	100 Tranquility.....2.20@220
150 Potosi.....	3.35@335	15 Tippecanoe.....2.90@290
200 Savage.....	3.10	300 Tuscarora.....25c@250
350 Sierra Nevada.....	1.10	300 Wales.....1.15@115

### Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Horn Silver, June 17th, \$7,500; Germania, June 17th, \$1,760; Hanauer, June 17th, \$1,400; Christy, June 17th, \$1,770; Ontario, June 17th, \$14,940; Ontario, June 18th, \$8,500; Germania, June 18th, \$3,200; Alice, June 19th, \$7,000; Germania, June 19th, \$3,700; Hanauer, June 19th, \$1,300; Horn Silver, June 19th, \$25,000; Frisco, June 19th, \$7,500; Ontario, June 19th, \$3,238; Germania, June 20th, \$1,850; Hanauer, June 20th, \$1,400; Horn Silver, June 20th, \$5,000; Ontario, June 20th, \$7,895; Bodie Con., June 20th, \$7,250; Northern Belle, June 15th, \$6,218.33; Mt. Diablo, June 17th, \$6,695.33; Indian Queen, June 13th, \$4,329.29; Navajo, June 20th, \$5,000; Northern Belle, June 18th, \$9,480.47; Mt. Diablo, June 17th, \$6,695.33; Western, June 19th, \$10,710.65.

In the Richmond-Alhambra cases, set for trial at Eureka, July 5th, a venire for 300 jurors will be issued.

### MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in Mining and Scientific Press and other S. F. Journals

#### ASSESSMENTS—STOCKS ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con. M Co	California	14	1.00	June 20	W. Willis	309 Montgomery st
Belle Isle M Co	Nevada	2	15	June 3	E. M. Hall	327 Pine st
Bullion M Co	Nevada	19	60	June 22	J. M. Brazell	310 Pine st
Caladonia M Co	California	11	25	May 27	C. V. Hubbard	410 California st
Caledonia M Co	Nevada	35	25	May 3	R. W. Veneer	410 California st
Equitable T & M Co	Utah	25	15	May 10	C. J. Collins	512 Montgomery st
Equator M Co	Nevada	4	25	June 7	W. Willis	309 Montgomery st
Grand Prize M Co	Nevada	5	25	May 27	F. M. Hale	327 Pine st
Hale & Norcross M Co	Nevada	69	50	May 10	J. F. Lightner	309 Montgomery st
Maybell Con M Co	California	8	20	June 22	W. J. Taylor	310 Pine st
Martin White M Co	Nevada	10	25	June 18	H. L. Scoville	309 Montgomery st
Mono & M Co	California	12	50	May 19	W. H. Lent	309 Montgomery st
Murphy M Co	California	6	15	June 10	S. D. Rogers	323 Montgomery st
Oro M Co	California	8	10	June 1	W. Stuart	323 Sansome st
Phoenix M Co	Nevada	23	10	May 9	H. Leeter	308 California st
Silver Hill M Co	Nevada	16	25	May 7	W. E. Dean	309 Montgomery st
Toga Con M Co	California	13	15	May 11	W. Deant	309 Montgomery st
Yellow Jacket S M Co	Nevada	41	1.00	May 9	Mercer Otey	Gold Hill

#### OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Arizona Mexican M Co	Arizona	1	60	May 7	G. R. Adams	320 Sansome st
Benton Con M Co	California	5	25	May 21	W. H. Watson	302 Montgomery st
Betty O'Neil M Co	Nevada	1	50	June 14	R. W. Heath	318 Pine st
Deer Blue Gravel M Co	California	8	10	May 11	T. Wetzel	622 Montgomery st
Eintracht Gray M Co	California	7	5	June 14	H. Kniz	209 Sansome st
Eschschuer Deep Gravel M Co	California	12	50	May 25	D. B. Chisholm	327 Pine st
Fresno Enterprise M Co	California	1	15	June 1	W. H. Allen	305 Pine st
Golden Gate Con M Co	California	4	50	May 19	J. T. McGeoghegan	318 Pine st
Harrington M Co	California	2	5	June 15	I. C. Miller	409 California st
Holmes M Co	Nevada	2	10	June 22	E. A. Holmes	318 Pine st
Iron Clad Con M Co	California	1	15	May 25	R. N. Van Brunt	309 Montgomery st
Lord of Lorn G M Co	California	1	15	Apr 19	W. H. Allen	318 Pine st
McMillen M Co	Arizona	3	20	Jan 12	J. Morizio	328 Montgomery st
North Standard G & S M Co	California	1	10	Apr 25	C. Van Dyck Hubbard	310 Pine st
Oakland G M Co	California	13	60	May 3	E. J. Hopkins	435 Montgomery st
Paris M Co	California	2	25	June 22	W. J. Taylor	310 Pine st
Rocky Point M Co	California	8	05	June 21	W. G. Hughes	330 Pine st
Red Cloud Con M Co	California	10	20	June 22	W. J. Taylor	310 Pine st
Red Hill Hydraulic M Co	California	4	15	May 10	A. B. Paul	323 Montgomery st
Silver King M Co	Nevada	3	10	May 27	A. C. Dobbrow	309 Montgomery st
Steep Hollow G M Co	California	6	150	June 21	J. W. Pew	310 Pine st
Swamp Angel G M Co	California	4	125	June 14	L. Little	607 Washington st
Three Brothers M Co	Arizona	1	30	May 25	C. Meade	324 Pine st
Union Gravel M Co	California	17	50	May 1	H. Pichon	325 Sansome st
Wolverine Gravel M Co	California	2	10	May 31	E. J. Blanding	325 Front st
Wide Awake M Co	Arizona	13	10	June 4	C. Hildebrandt	Cor Bush & Monty

#### MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Associate Stock Brokers	S. F.	J. W. McClung	Stock Ex	Annual	July 11
Bluebird M & M Co	Nevada	W. H. Knight	10 Market st	Annual	June 25
Blue Bird M Co	California	W. H. Knight	10 Market st	Annual	June 25
Mt Potosi M Co	Nevada	H. Lowden	330 Pine st	Special	July 25

#### LATEST DIVIDENDS—WITHIN THREE MONTHS

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Eureka Con M Co	Nevada	W. W. Traylor	37 Nevada Block	50	June 20
Father De Smet M Co	Dakota	H. Dean	New York	50	June 10
Northern Belle M & M Co	Cal	Wm Willis	309 Montgomery st	50	June 16
Northern Belle M & M Co	California	Wm Willis	309 Montgomery st	25	June 15
Silver King M Co	Arizona	J. M. Brazell	315 California st	25	June 15
Standard Con M Co	California	Wm Willis	309 Montgomery st	75	June 13
Western M Co	California	C. S. Curtis	309 Montgomery st	75	May 12
Navajo M Co	Nevada	E. M. Hall	327 Pine st	25	Mar 25

#### The Mining Share Market.

The mining share market has been rather weak for some days. The quietness of matters on the Comstock, and the non-appearance of any bonanza, keep the market from any upward tendency. The *Enterprise*, notwithstanding, says: Again we have reached a point where we may with good reason expect to see advances that will outweigh the recessions; or, in other words, a gradual rise in prices may now be looked for. An advance upon present prices is warranted not only by the general favorable condition of affairs in the leading mines along the lode, but also by promising improvements at several points.

The east crosscuts on the 2500 level of the Sierra Nevada mine will be nearing a point where we may reasonably expect to hear of ore being encountered. The material in the bottom of the joint Sierra Nevada and Union Con. winze, now nearing the 2700 level, is of a very favorable character, and is steadily improving. Although there is no particular change in the appearance of the material in the bottom of the joint Ophir and Mexican east winze, a change may be looked for ere long. The present stratum of bird's-eye porphyry cannot last forever. As it lies very flat, not very much more material than constitutes its real thickness is being cut through. It is hoped that this great core of bird's-eye porphyry will be found to have compressed the ore-bearing portion of the material of the vein into a degree of compactness favorable to fertility. Although few persons appear to be giving heed to the fact, an east crosscut is already in progress on the 2700 level of the Ophir and Mexican mines that is liable soon to reach something of value.

THE STATE BAG FACTORY.—The State will soon attack the practical part of its bag making enterprise at the State prison at San Quentin. A correspondent of the *San Rafael Journal* gives the latest information on the subject. It says that the new factory is a building 240 ft. long by 140 ft. wide, of brick, one story high with concrete floor, to hold machinery consisting of 100 looms and 44 other machines, such as spinning frames, dressers, warp winders, dry spinners, dampers, measurers, sack cutters, and finishers. All these are for the manufacture of jute burlaps from the raw material, which at present must be imported from Calcutta, and of which 500 tons have already arrived and are in store at San Francisco. The building now in course of construction, will have an inside frame work of heavy trussed timbers with gable roofs, running laterally, and to be covered with tin. The machinery, which has been manufactured in England, is due at San Francisco the latter part of this month, and there is no doubt but that by the last of September, the factory will be in full operation and giving steady work to 400 prisoners.

#### New Incorporations.

The following companies have been incorporated and papers filed in the office of the Superior Court, Department No. 10, San Francisco:

BLINN LUMBER Co.—June 22d. Object, to deal in lumber, building material, etc. Capital stock, \$150,000. Directors, L. W. Blinn, O. G. Goodhue, F. E. Hooper, C. A. Hooper, George W. Hooper.

LITTLE PRINCE M. Co.—Location: Cache County, Arizona. Capital stock, \$1,000,000. Directors, A. S. Allen, J. H. Helm, J. L. Homer, Wm. Hazlehurst, H. H. Rockwell.

PINAL CON. M. Co.—Location: Pinal county, Arizona. Capital stock, \$100,000. Directors, S. Linkton, H. N. Noble, F. Loran, S. Hart, Henry Donnelly.

ZONK G. & S. M. Co.—Location: Yavapai county, Arizona. Capital stock, \$10,000,000. Directors, R. Bernhardt, H. G. Cuhl, H. T. Graves, F. H. Simon, D. S. Griswold.

LIMA CON. M. Co.—Location: Arizona and Mexico. Capital stock, \$2,000,000. Directors, R. D. Fowler, C. J. Greene, W. H. Fowler, Charles R. Brown, Joseph T. Fisk.

#### The Coming Fair.

A meeting of the Board of Managers of the Sixteenth Industrial Exhibition was held on Tuesday evening last. It has been decided to change the interior of the building from last year, by having two main aisles running from Mission to the center, and one from Market street. The machinery will be partitioned off from the main hall, thus giving the music a better chance. The number of applicants for space is now in excess of last year. To encourage inventive talent, an "Inventors' Gold Medal" is offered for the best recent Pacific Coast invention, the award to be decided by a committee of acknowledged mechanical ability. The art gallery will contain greater and more attractive features this year than ever before shown at these fairs, the particulars of which the managers are not yet ready to announce. Bids for music from



few first-class mines would be added to those now being worked. Like farming or any other productive industry which requires patience, perseverance and economy, to make it a success, so is mining.

#### NEVADA.

**LITTLE YORK.**—Nevada Transcript, June 10: Dean Colburn is about to reopen the Siderich drift tunnel. Bludmer & Hotzinger are making a 20-day run to their hydraulic claim. Seth Martu is doing well at his Mt. Oro drift claim. He is reported to have recently found some very fine specimens, including one that weighed 7 ounces. The incline of the True Blue mine, owned by Nevada City parties, on Friday struck bedrock on what is supposed to be the east rim of the channel for which they have been sinking. Gravel was struck in the tunnel of the Wind-up drift mine lately before last, and some very good prospects obtained. The tunnel is in nearly 1,400 ft., and we believe shows a color for the first time. The Wind-up is a Grass Valley company who have spent a great deal of money in prospecting there. Some persons maintain that the channel—said to be a "blind" one—where they are searching, comes down the ridge from the Centennial claim in Washington township.

**SARGENT & JACOBS MINE.**—Nevada Transcript, June 17: Twelve men are now employed in Sargent & Jacobs' drift mine at Quaker hill. The tunnel is now in 600 ft west from the shaft. A drift going south is to be started this week. The gravel in the present breast is looking fair.

**WASHINGTON MINE.**—Grass Valley Union, June 20: For some time the drifts on the 25 level of the Washington mine have been extending to the north and south of the shaft without satisfactory results, as the quartz did not make into a permanent and compact vein. Lately it was determined to crosscut into the foot wall, at a point in the south drift where quartz stringers seemed to be going in that direction, and after driving a few feet through very hard ground a strong ledge was struck into on Friday night, but owing to a heavy flow of water its thickness has not been determined. As the water is now under control the width of the ledge will soon be ascertained. It is said to be a compact vein of fine-looking quartz.

**APPOINTMENT.**—Mr. E. M. Sunderland, of North San Juan, has been appointed special agent of the State Miners' Association, and will soon visit all the mining districts of Nevada and adjoining counties with a view to increase the membership of the association.

**NEW YORK HILL.**—This noted quartz claim, on New York hill, is again turning out rich specimens of rock of the kind that has to be gathered up in boxes and stored away until it can be mixed with a poorer quality of rock for crushing. This rich quartz is being taken out by John Ford & Co., the lessees of the mine, and is about of the same bonanza quality as that previously taken out.

**GOOD QUARTZ.**—Thomas Scadden has been prospecting for some time on the quartz claim on Rhode Island ravine, between the Seola mine and New York hill, and at the depth of between 35 and 40 ft, has struck a ledge from 6 to 10 inches in width that shows well in free gold. All the rock that has been taken out is of good quality, and there is reason to hope that the find will prove valuable.

#### MARIPOSA.

**FIRE MINE.**—Mariposa Gazette, June 18: Extensive preparations are being made to vigorously prosecute the work of this mine with an increase of power and force, double to that previously had, by building an additional 40-stamp mill, increasing the water power and penetrating the mine at greater depth, which will require a vast amount of lumber, machinery, labor and money. An expenditure of at least \$200,000 is contemplated by the company in constructing the new mill and making the improvements referred to. Mr. Bothwell, the superintendent, appears to be a man of fine executive ability, and is making a favorable impression with all who form an acquaintance with him.

**EL CARMINE MINE.**—This quartz mine is situated about 3 miles east of Hite's Cove. Like hundreds of other mines similarly situated at this time, it was discovered and worked on a limited scale by the poor, honest miner, who tenaciously held on to his small property, many years, waiting for a helping hand from capitalists, and waited until death relieved its discoverer of all anxiety. Several attempts have been made since to develop the mine by parties of limited means, which failed until the property fell into the hands of Mr. Robert Williams, of this place, who, with his own private means, developed the mine sufficiently to attract the attention of capitalists. The mine was sold to Mr. J. J. Dolan, a Philadelphia secretary and treasurer of the company, arrived last week. He started for Philadelphia on Monday, going by way of Quincy. The company intend soon to erect hoisting works so as to work the lower 300 ft of the shaft and bring the ore that distance to the tunnel, through which it will be run to the mill on cars. The 24 stamps are running uninterruptedly, and the appearance of the entire property is remarkably good.

#### PLACER.

**DRIFTING ON THE DARDANELLES.**—Placer Herald, June 18: The Dardanelles Co. has opened up several breasts in the ground over the Vigilance tunnel from which come some very flattering reports. Not more than 40 carloads per day are being taken out yet, but in a week or 10 days they will be taking out about 100. The yield at present is from \$23 to \$34 a load. Prospect drifts have been run back into ground that prospects from \$2 to \$10 a pan. Into this a bedrock tunnel is now being run and in about 30 days breast will be opened.

#### PLUMAS.

**CRESCENT.**—Greenville Bulletin, June 15: Indications are favorable for the starting of this mill, and reopening of the mine which has lain unworked for so many years. A great amount of gold has been taken out in the years gone by, and anyone who knows the mine is well aware that immense quantities of good ore can easily be obtained from it, as it has been but partially worked. **INDIAN VALLEY.**—Mr. E. A. Corbin, of Philadelphia, secretary and treasurer of the company, arrived last week. He started for Philadelphia on Monday, going by way of Quincy. The company intend soon to erect hoisting works so as to work the lower 300 ft of the shaft and bring the ore that distance to the tunnel, through which it will be run to the mill on cars. The 24 stamps are running uninterruptedly, and the appearance of the entire property is remarkably good.

**ARIZONA BRANCH.**—Plumas National, June 18: During the past week the noted mine belonging to Loring & Leavitt, of Elizabethtown, was sold to Corbin, Manson & Co., for \$50,000, cash. Negotiations in this direction have been pending for several weeks, but nothing definite had been arrived at until Wednesday, when the bargain was closed. The mine is paying splendidly, in fact better than ever, and the new owners will put on heavy machinery and work it much more rapidly than heretofore. There is but little doubt that it will prove one of the richest mines in northern California, and we wish to see new owners the best possible success. The former owners, Messrs. Loring & Leavitt, are to be congratulated on their good fortune, as in a few months they have amassed a competency, and can now take it easy for the balance of their lives.

**STRUCK IR.**—Mr. L. Bell showed us some very healthy looking nuggets on Tuesday evening from the Western claim, near Newtow, the result of a small washing of dirt. One or two of the pieces were an ounce or more in weight, and proved that they had found the pay streak which they have been prospecting for several weeks.

**EAST BRANCH IR.**—The East Branch miners are all busy at work, with fair prospects. Lazier & Co., on Indian hill, continue to work their claim very successfully, and have ground out enough to employ them for years to come. Messrs. Keay & Livingston, working the noted Irish crevice, leading from Indian har into the hill, are being richly rewarded for the efforts, picking up daily nuggets of good size, and anticipate a rich harvest of gold when they shall have reached the bottom of the crevice.

**YELLOW CREEK M. Co.**—This company has been for several years engaged in making a canal of great capacity to conduct the waters of Yellow creek, in Humboldt valley, to the banks of the North Fork or below Junction bar, and having completed the work have put into operation one first-class hydraulic chief. The extensive gravel banks along the North Fork, Yellow creek and Mosquito

creek, promise great results for this important enterprise. **FRENCH RAVINE QUARTZ.**—The work of developing this mine has been commenced by F. R. Whiting.

#### SIERRA.

**REWARD.**—Mountain Messenger, June 18: The Bald Mountain M. Co., on Tuesday, put 50 men at work drifting, at \$3 per day. These men have been at work on repairs since the 1st of the month. None of the old drifting force have yet been put on.

**AIR COMPRESSOR.**—The Savage Co. have put in an air compressor for running the drills in their tunnel. The distance to the face is such that before the steam reaches the drills there is much condensation.

**GOLDEN GATE.**—The name of the Oriental mine, Allegheny, is changed to Golden Gate mine, and is now owned ostensibly by a New York company. It is reported that work is to be commenced on it in a short time. From the fact that Benham was in town a few days ago, driving a span of fine horses, we infer that he is to be superintendent.

**STICKS ROBBED.**—The slaves of Wm. Planks, Eureka, were robbed not long since, the robbers getting well paid for their trouble. It is supposed that Chinamen did the job.

**PHOENIX.**—We are informed that the Beard Bros., of Sierra City, were recently offered \$125,000, cash, for the Phoenix quartz mine, Sierra City, but refused to sell at that price.

**AMERICAN M. Co.**, at Morristown and Craig's flat, will finish working about the 1st of July. The season has been a good one for them.

**THE DUTCH CO.'S** mine, at Logansville, J. T. Mason, Supt., is paying handsomely under the new management. Johnny can make a mine pay if anyone can.

**BLACK JACK.**—This mine is prospering, apparently. Carpenters have been at work some time putting in new machinery, and will finish their job in about two weeks more.

**RICH BOWLER.**—In Harry Richard & Co.'s mining claim, at Eureka, a quartz bowler weighing 9 ounces was found to contain nearly 5 ounces of gold. It was discovered by its weight.

**NO GRAVEL.**—The report that the Savage Placer Co. had struck gravel was not true.

**THE KUBLY** tunnel, Cariboo, is now in over 1,600 ft. Rock is still very hard. Progress made, about \$ ft per day.

**ITEMS.**—The Bonanza M. Co., of Howland flat, is paying finely at present. The Pioneer mine, at Grass flat, is looking finely. They will have water for some time yet.

#### SISKIYOU.

**EXAMINATION.**—Oregon Sentinel, June 18: Richard Cook, one of our mining experts, left this week for Siskiyou county to take a look at the quartz ledge of Messrs. Miller & Kime. Mr. Cook has been employed to make a thorough examination of the property and pass his opinion upon its value preparatory to opening the mine with machinery, etc.

#### TRINITY.

**CLEANING UP.**—Trinity Journal, June 18: Miners hereabouts and elsewhere in the county are now engaged in cleaning up their claims for the season, and it is probable that most of them will be done by the close of the present month. The season has been a short one, but good work was done while it lasted. Although we have not been furnished with any figures, the impression prevails that Trinity county mines will pay well this year. Certain it is that a great deal of gold dust is being shipped, and that is the best indication we know of the paying character of our gravel mines.

**STEWART.**—Stewart Gibson was in from Deadwood this week, and showed us a couple of specimens from his recently discovered ledge. Free gold was visible, and Stewart says he expects to find plenty more of the same character, as the ledge is large and well defined.

#### TUOLUMNE.

**NEW MINING CO.**—Independent, June 18: A Stockton company have organized themselves to work the old United States lot and others adjoining containing the Divoll Bonanza lead. The working shaft will be not much over 150 ft from that of the Bonanza. The line from thence passes across the flat under the Episcopal church to the opposite hill, and connects with the Colby or Big Bend claim. Under this contract, which provides a bonanza to many a miner in early days, got its main feed from this vein. Active operations have already commenced, and Vinc. Wooster, an old experienced miner, is the superintendent.

**NOTES.**—Mr. Eames has started up his 10-stamp mill on the Shaw mine. The new Toledo quartz mill is a success, and things are active about the mine. The Sonoma mine has let another contract, which when completed will make the depth attained in No. 2 shaft 125 ft. The ore is improving as depth is attained.

#### NEVADA.

##### WASHOE DISTRICT.

**CALIFORNIA.**—Enterprise, June 10: On the 2000 level the north drift from No. 1 winze has been extended 18 ft. Progress in this drift is 13 ft. On the 2500 level the joint Con. Virginia east crosscut has been advanced 19 ft, cutting out station for joint Con. Virginia winze.

**HALE AND NORCROSS.**—We are anxiously awaiting the starting up of the hydraulic pump at the Chollar-Norcross-Savage shaft, that we may stop our pump and make some repairs to the perpendicular shaft, which are absolutely necessary, and which cannot be made while our pumps are running.

**SIERRA NEVADA.**—During the week 350 tons and 200 lbs. of ore, assaying \$31 per ton, have been extracted.

**UNION CO.**—On the 2500 level the joint Mexican winze has been sunk and timbered 9 ft, and the joint Sierra Nevada winze 12 ft; also, have completed the tank station and placed the tank in position.

**CON. VIRGINIA.**—On the 2500 level the joint California east crosscut has been advanced 10 ft. Are cutting out a station for joint California winze.

**MEXICAN.**—On the 2500 level the joint Union Con. winze has been sunk and timbered 0 ft, and the joint Ophir east winze 11 ft.

**OPHIR.**—On the 2500 level the joint California winze has been sunk and timbered 13 ft, and the joint Mexican east winze 11 ft.

**ALTA.**—During the past week we have sunk and timbered the shaft 27 ft; total depth, 2,067 ft. The rock continues hard.

**UNION SHAFT.**—Cutting out station at the 2700 level and easing the timbers at the 1900, 2000, 2400 and 2500 levels.

**NEW WELLS-FARGO.**—Last Friday the shaft was cleared of water, but the bottom was found to be filled with debris above the drift from the shaft. The flow of water is as strong to allow of any effective work in removing the rock and earth which now obstruct the entrance to the drift. Most of this water is seepage, however.

**YELLOW JACKET.**—Since my last we have reached the 2825 station, and find the shaft and drift in good condition. We have placed two large donkey pumps at this station to raise the Belcher water to the 2800 tank.

**SUTRO TUNNEL.**—Three carpenters have been employed during the week finishing the drain boxes and making the connections. The small sub-drain leading from the Combination connection to the south lateral junction is now excavated for a total distance of 130 ft. Additional to the usual work along the main line, considerable repairs have been made this week on timbers in the main tunnel. During the week the repairmen have lowered the track at the Yellow Jacket work point for a distance of 100 ft, finished lagging up the carriage station and cut a small ditch from the turning point to the face; also, extending the second line of blower pipes to the carriage station and making the necessary repairs in the drift.

#### DUN GLEN DISTRICT.

**AUBURN MINE.**—Silver State, June 20: From J. A. Conlee, foreman of the Auburn mine at Dun Glen, an experienced and intelligent miner, we learn the following relative to the property. Mr. Conlee, upon assuming charge of the mine some three or four months ago, found two tunnels, each about 30 ft long, and running parallel with

each other, a short distance apart on the lead. These tunnels cut the ledge at right angles, but did not determine to any great extent its richness or permanency. In drifting on the lead from the old tunnels, he finds the ledge to be from 20 to 30 ft wide, as far as opened—some 120 ft. The ore is of high grade, and is estimated from a number of assays made that it will average \$40 to the ton. It is his intention to run this drift north on the lead to the surface, on the slope of the hill. In the new tunnel he has cut the vein 30 ft below the level of the old tunnels. The ledge is 30 ft wide, but the ore is generally low grade, not over 3 ft of it being up to the average in the drift from the old tunnel. As these tunnels are 800 ft apart on the line of the ledge, they establish its permanency beyond reasonable doubt. The ore in sight is sufficient to warrant the company in erecting a mill, and the intention is to commence grading for that purpose about the 1st of July. Twenty stamps will probably be put in the mill this summer, and its capacity will be increased to 40 or 60 stamps if the developments in the mine warrant the increase of the reduction works. The mine is located about 10 miles from Winnemucca, and the mill will be erected a few miles below the mine, in what has been known as Grass Valley country. The mine is owned by a number of mine, and large quantities of ore, extracted in running drifts on the lead, are on the dump.

#### ESMERALDA DISTRICT.

**THE HUMBOLDT WEST.**—Esmeralda Herald, June 18: There have been considerable improvements made in and about the mine since our last report. The ground around the opening of the shaft has been leveled off, and the ore dumps put in good shape. The Humboldt West is one of the biggest and best mines in Nevada, having, at the depth of 100 ft, a ledge 23 ft thick that will average not less than \$30 per ton. With a 90-stamp mill it would turn out in this neighborhood of \$250,000 a day.

**SILVER.**—The ledge in the Humboldt West on the north is the Silver Lining, on which is a strong ledge of good ore. Assays recently taken give flattering results.

**EVA COS.**—Three assays were recently made of ore taken from the shaft at a depth of 50 ft, with the following results, which show the lowest value per ton to be \$35.72, while the highest is \$52.63.

**THE KORTZ.**—The incline shaft last night reached a depth of 120 ft from the tunnel level, which makes the total depth from the croppings 233 ft. The ledge in the bottom of the incline is 10 ft thick, and the ore is immensely rich, with not a particle of waste rock mixed in. There is now on the dump about 150 tons of ore.

**THE CENTENNIAL.**—The ore being extracted from the upraise continues of the same high grade. The bottom of the incline is over 200 ft from the croppings, and the thickness of the ledge is the same, with the quality of the ore fully as good as not better than at any other point.

#### EUREKA DISTRICT.

**STARTED WORK.**—Eureka Sentinel, June 14: The Eureka (Nev.) M. & S. Co. started work on the Kit Carson mine, which was sold by the Eureka Mining Co. to the intention of the company to do a large amount of work this summer. At present the mine is looking well. **GEDDES & BERTRAND.**—This mining property was purchased a few weeks ago by Gilmer, Salisbury & Co. Since that time they have had a force of men employed in putting the mine in shape to do vigorous and systematic work. While thus engaged ore has been found in several places where it was not thought of looking for it. The ore now in sight will more than return to the owners of the mine the purchase money. The ore is of very high grade. We look for the Geddes & Bertrand mine to make one of the finest properties in the county. The new company are highly pleased with their prospects.

#### HIKO DISTRICT.

**TEST.**—Pioche Record, June 14: P. Vallejo left Pioche Saturday evening for Hiko, going there for the purpose of examining ore recently discovered. He will start the mill up to make the test, and should the ore prove sufficiently rich to pay expenses he will keep it running, but, if not, will at once close down the mill. Henry Raymond will shortly be back.

#### HUMBOLDT DISTRICT.

**SATISFACTORY.**—Silver State, June 8: Sol. Kunkle and Judge Barbee, of Salt Lake, have gone to Humboldt district, which is situated in the Humboldt range, east of Humboldt, and with the intention of engaging in mining operations. They visited the district two or three weeks ago, and took samples from several ledges, which they have assayed at Salt Lake. The results were so satisfactory that they have returned with the intention of developing some of the ledges from which they took the samples.

#### PARADISE DISTRICT.

**FAVORABLE.**—Silver State, June 18: Reports from the Paradise mines continues favorable. The ledge in the joint shaft which is being sunk by the Ballioli and Wild Goose companies continues large and rich. As the shaft is over 200 ft below the surface, it is now demonstrated beyond doubt or cavil that the ledge continues downward, and carries rich ore to an indefinite depth. The Red Dog Co. have recently made very important developments in a drift 90 ft from the surface. It is supposed to be the main ledge, which mining men have predicted would be found between the porphyry and metamorphic slate formations. Large deposits of sulphurates have been found in crosscutting the ledge, and that kind of ore is considered valuable for the production of sulphur. The Paradise mine, which is owned by W. Letts Oliver, Sec'y of the company, will shortly resume operations, and the attention of Eastern capitalists is being drawn to the district by the success of the Bullion and other companies which are prosecuting work. For some reason a determined effort has been made by certain San Francisco operators to bring the district into disrepute, though it has produced as much bullion as almost any mining camp in the State proportion to the amount of work done and money expended in developing the mines.

#### SACRAMENTO DISTRICT.

**ENCOURAGING.**—Silver State, June 20: Very encouraging reports continue to be received from Sacramento district, in the Humboldt range. It is said that if such prospects as are now being opened there were found in some local area away from railroads, it would cause a rush of miners to the camp; but as they are in an old, though unprotected district, they cause no excitement and attract no attention.

#### ARIZONA.

**NOT SOLID.**—Arizona Journal, June 16: The statement that the Total Wreck mine had been sold for \$800,000 proves, on investigation, to be wholly incorrect. The company owning the mine has been incorporated, and the stock is selling freely in the East for \$7 per share, or at the rate of \$1,400,000 for the mine. Civil Engineer Paul Ricker, of the Surveyor-General's office, recently made a careful survey of the workings of the Total Wreck, and his report, it is said, is to the effect that there is now no less than \$2,000,000 worth of ore in sight. As the grade of the mine is very high grade—\$80 to \$100 per ton, free milling at that—it will be seen that the Total Wreck is even now a bonanza of huge proportions.

**"NOVEL STRIKE."**—While prosecuting the work of development in B. P. Parker's well-known mine in Old Hat district—the Bonanza—a rather novel strike was made. It consists of a 12 to 18-inch vein of red ochre oxide of iron, or natural red paint. Some samples of the ore were brought in a few days since and left with Wetmore & Dean, the assayers on Meyer street north, and experiments made with them have resulted very satisfactorily. The stuff, which is about of the consistency of soft chalk, requires only grinding and mixing with oil to make a very excellent coarse red paint. Large quantities of this kind of paint is and can be made in Arizona, and Mr. Parker will find a ready sale for all the red ochre he can produce.

**OLD DOMINION COPPER.**—Globe Chronicle, June 16: Since last report there has been about 25 ft of tunnel run on the Old Dominion tunnel, and as work progresses the ore is found to be getting better, and a larger body than ever has been uncovered. Developments on the New York and Chicago are of a most satisfactory nature.

**WASHINGTON.**—The Supt., Mr. J. D. Larue, was in town last Monday, and reports favorably on this mine. The main shaft is now down 154 ft. The northeast drift on the 70 ft level is in 62 ft. The ledge, however, was tapped last Friday, which showed well. On the 152 ft level a station is being cut out for the purpose of cross-cutting the ledge.

**TRK EMLINA.**—This fine property, recently sold by Mr. J. L. Clark, to Messrs. Newcomb and Tabor, of Boston, is improving with every foot of development it receives. Work was resumed by the new ownership and under the superintendence of Mr. Clark last Thursday. The face is all in ore, and a strip of about 18 inches of the ledge is high grade, giving an average assay of over \$500 to the ton. The mine is being worked with day and night shifts. **N. R. COLONEL SURVEY.**—This magnificent property is on the right bank of the Pinal creek, about four miles below Globe. It is opened on the ledge, which is about four ft and a half wide, by a tunnel entering the hill toward the northeast, and is now in about 75 ft, and exposes one well which is as smooth and straight as any to be found in the district.

**MEX. SOLA.**—Pinal Drill, June 18: The Silver Bell Quartz for \$20,000, and the Columbia for \$10,000, both to Aaron Mason, for cash. We have frequently described these excellent properties. They are contiguous, and situated about 10 miles South of Pinal, toward the Gila river. The owners of the Silver Bell Quartz were K. Conn, H. B. Murray and W. Munton. The owners of the Columbia were Champion, Goodfellow, T. Farrell, W. Hapton and J. H. Cox. Two days run on the mine, and four days run produced \$1,100 at the Windsor mill, out of the tellings, and still they run. The expenses are about \$60 per day.

**SAN PEDRO DISTRICT.**—Pinal Drill, June 18: The San Pedro district, also in Pinal county, is 7 miles westerly of the San Pedro river. Here are the following mines: The Sample, Pioneer, Walston, Yellowhammer, Silver Chief, and Arizona. Two days run on the mine, and four days run produced \$1,100 at the Windsor mill, out of the tellings, and still they run. The expenses are about \$60 per day.

**PIONEER DISTRICT.**—Globe Chronicle, June 16: The Pioneer mine, owned by Mr. Geo. Scott, is on the same ledge with the Pioneer South, and with as much development will, in all probability, prove to be as good property. **MASKE.**—Messrs. Bibb, Wentworth and Pascoe, started last Tuesday for the Mahel mine, near El Capitan, where they have landed a large supply of provisions, with the intention of making a thorough development of this property. A rich strike was recently made.

#### COLORADO.

**DECATUR ITEMS.**—Georgetown Courier, June 16: During the past week, parties representing large companies in New York, San Francisco and other points have been inspecting our mines, and from what they say, one is led to believe that Decatur's day of prosperity is beginning to dawn. In no instance have they expressed disappointment; on the contrary, they were surprised that we have not got a larger number of capitalists among us. When you can find prospects only 10 ft deep that yield \$10 a day to the man, and ore that mills from 500 to 1,000 ounces per ton, it is considered by old miners good enough to go and complete the mine. Such is the state of the prospects are being worked, not with the intention of selling at the first offer, but for the purpose of developing and placing them in good shape. Confidence in the future is growing daily, not only with those who own mining property, but with capitalists and tenderfoot, also. Town property is steadily advancing, quite a number of new houses are being built and a large number of persons contemplate building during the summer. Work has been resumed on the Carraway, Fatal, Humburg, Woodbeam, Big Chief, Keithly, Argentine, High Line, Lilly May, and other lodes too numerous to mention, from one to four men being employed upon each of them.

**CASCADE DISTRICT.**—Georgetown Courier, June 10: A strike of 12 inches of 200 ounce ore was made last week on the Silver Ring. The Charter Oak lode, owned by the Leelanau M. Co., and worked by Roberts & Co., lessees, is making regular monthly shipments, the ore being dressed into three classes, which mill from 54 to 150 ounces of silver per ton. The pay vein is from 12 to 10 inches wide.

#### MONTANA.

**NELLIE GRANT M. Co.**—Helena Independent, June 14: This is a new organization or property recently bought by H. S. L. Sheard. The entire purchase consists of 8 locations on Red Mountain, comprising the Nellie Grant, after which the organization takes its name, the Treasury, Treasury No. 1, Good Friday, Gen. Sherman, Gen. Grant, Cannon and Cannon Extension. The price paid is \$120,000, and cheap enough at that. The Nellie Grant is estimated to be worth fully the amount paid for the entire group of mines, while Mr. Sheard is well persuaded that his company have the entire value of all they have invested in the Treasury.

**TRUCKEE.**—Little Jennie, of the Vaughan district, had ready for shipment to Wickes on the day the works were consumed, 60 tons of ore taken from the dump, which carried 82.61 ounces of silver and \$12 gold per ton. There are out about 60 tons of the best grade ore, carrying from 300 to 500 ounces, and 40 tons of second grade carrying from 125 to 150 ounces of silver per ton, now ready for shipment. The mine is estimated to have produced not quite \$200,000, under circumstances not at all favorable to the economical development of the property.

**THE BONANZA CHIEF.** M. Co. started their 20-stamp mill when their mine was less than 30 ft deep, but it has continued to run since that time when the water supply was sufficient. In what is known as the south drift, a level has been run for a distance of 110 ft, all the way in good ore, but it seems as if the progress has been made to attain depth and open up stopping ground. The first run of last month netted about \$11 in gold to the ton, and this ought to yield a profit and encourage a better development of the property.

**THE ALTA MONTANA CO.** has set every man in camp at work clearing away the rubbish from the grounds, preparatory to putting the new works in order. The superintendent thinks that within 30 days he will be able to start the water concentrator.

**A PERSONAL VISIT** to the Gloster mine, owned by the Boston & Montana G. M. Co., has more than confirmed our estimate of the property. Its situation for economical working is all that could be desired, and it possesses one peculiarity seldom found in any mine. The rock is so soft that whether work is prosecuted in the vein or country rock, which is granite, there is no need of blasting.

#### OREGON.

**APPROXIMATE.**—Oregon Sentinel, June 18: William Healy, one of the oldest miners of upper Applegate, spent a few days in town this week. Bill says "there are millions in it," if only the proper appliances could be brought to bear on it.

**NUGGET.**—Geo. Schumpf, the mail carrier, on Wednesday brought in a beautiful nugget of washed gold, weighing over 4 ounces. It was found a few days ago at the Collins & Thurman claim on Elliott creek, a point west of by last summer's freshet. The nugget was valued at \$81.12.

**WAGNER CREEK.**—Horace Seybert, of Wagner creek canyon, has lately been prospecting a quartz ledge which he discovered on the mountain dividing the waters of Little Applegate from the waters of Wagner creek. The quartz prospects \$30 (fine gold) to the ton of rock. Mr. Seybert thinks it is a good thing.

**WARNER RANCHO.**—Lakeview Herald, June 16: Considerable excitement is being created here over the appearance of quartz recently found in the Warner range hills. Somebody expects to strike a bonanza at no distant day within a stone's throw of town. Evidently there is an abundance of the precious metal in the hills hereabout, and all that is needed is enterprise with a little capital to develop some of the ledges already located.



### The Hydraulic Miners' Meeting.

The following is an Associated Press dispatch from Nevada City, dated June 18th, giving the particulars of the miners' meeting held at that place on that date:

The holding of the miners' mass meeting in this city to-night brought together a large and enthusiastic crowd of people from all parts of this county, and many from Placer, Sierra and Yuba. A delegation of about 50 men arrived from Smartsville, Yuba county, shortly before six o'clock P. M., and drove into town in procession. In the afternoon flags floated from all the flagstaves in the city, and in the evening, previous to the meeting, two hands discoursed music on the streets and in front of the hall, while an incessant and deafening firing of giant powder cartridges was kept up. Shortly after eight o'clock the meeting was called to order in the theatre by Hon. W. D. Long, who stated, in a few words, its object. Major J. S. McBride was chosen Chairman. The following Secretaries were elected: Permanent Secretary, J. E. Brown; Assistants, L. S. Colkins, of the *Transcript*, J. B. Gray, of the *Herald*, C. H. Mitchell, of the *Grass Valley Union*, and Rufus Shoemaker, of the *Free Lance*. The following persons were chosen:

#### Vice-Presidents of the Meeting.

W. D. Long, Nevada City; Jas. O'Brien, Smartsville; Thomas Mein, Blue Tent; J. B. Patterson, Little York; E. Coleman, Grass Valley; O. P. Stidger, San Juan; G. A. Allan, Nevada; James Marriott, North Bloomfield; J. Spaulding, Dutch Flat; James Gould, Gold Run; Chas. Haggerty, Moore's Flat; P. Nichols, Dutch Flat; G. W. Cumminge, Oroville; J. C. Coleman, Grass Valley; H. C. Perkins, Bloomfield; H. S. Brigham, Moore's Flat; R. C. Walrath, Nevada. Hon. W. D. Long introduced a resolution that a committee of three on resolutions be appointed, to whom all resolutions should be referred without reading. The following committee was appointed: Hon. W. D. Long, Hon. Niles Searle and R. McMurray.

#### A Pointed Address.

O. W. Cummings, of Oroville, was here introduced, and made some pointed remarks concerning the present state of affairs between the farmers and miners. He eulogized the miners and stated that they had made the State what it is, and not the farmers; the miners expected to prove that for every yard of debris they had deposited in the river the farmers had deposited 15. He urged the miners to put their shoulders to the wheel and help along their cause. The speaker was intensely listened to, and frequently applauded. The Committee on Resolutions here reported as follows:

#### The Resolutions.

To the citizens of Nevada and adjoining counties, in mass meeting assembled: Your committee, appointed to draft and present resolutions expressive of the sense of the mining community regarding the pending litigation by the city of Marysville against the hydraulic mines, beg leave to report as follows:

Whereas, Mining is the present industry of the Pacific coast, and through which our State was mainly settled, and by which every other interest has been vitalized and built up;

And whereas, the millions of gold annually yielded as the out-put of hydraulic mining can only be received by turning the debris arising therefrom into the mountain canyons and ravines;

And whereas, the city of Marysville, in derogation of an implied compact to await a solution of the drainage problem, is prosecuting an action against the hydraulic miners, and has caused an injunction to issue restraining such miners from prosecuting their legitimate calling, and which, if persisted in, and if successful, must eventuate in the entire destruction of our property values, and in the impoverishment of our people; it is now, therefore, by the miners and citizens in mass meeting assembled:

Resolved, That most of our mining property is held by patents from the Government of the United States, and having been purchased for the express purpose of mining by the hydraulic process, was taken and is held under an implied license to use it in the only available manner.

Resolved, That we most sincerely regret any injury which has or may result to Marysville, or the agriculturists in its vicinity, from the effect of mining debris, and that we have been and still are ready to assist by every legitimate means known to science in averting the evil consequences to them from mining operations.

Resolved, That the drainage scheme inaugurated by the Legislature offers, we firmly believe, a plan for the intelligent and successful solution of the vexed question; a solution alike beneficial to agriculturists and miners.

Resolved, That litigation cannot stop, that injunctions cannot restrain, the mass of mining debris now in our mountain streams, and which eventually must engulf Marysville unless arrested by intelligent and united action.

Resolved, That by 30 years of encouragement, by the payment of taxes and by a recognition of our industry in an endless variety of forms, we have acquired a vested right to the legitimate use of our mining property.

Resolved, That the attack upon hydraulic mining is but the entering wedge to a scheme which, if successful, has for its object the destruction of all mining property and every interest connected therewith.

Resolved, That for the purpose of protecting ourselves and those dependent upon us in the enjoyment of our homes, we will hand ourselves together, and by every effort which free men

may legally make we will battle for our rights and dare to defy those who would wrest from us the privilege of enjoying our hard-earned property.

Resolved, That we invite the co-operation of every citizen having the welfare of the mining region at heart.

Resolved, That the thanks of this meeting are hereby tendered to the Miners' Association for its stalwart efforts in behalf of our interest, and we hereby declare our unflinching confidence in the wisdom of its proceeding, and pledge to its support and maintenance such pecuniary aid as it wants and our ability will permit.

Resolved, That we deprecate as unjust and oppressive in the extreme the use of the extraordinary remedy of injunction to stay the exercise of a great industry, in which millions of capital have been invested.

Resolved, That we recommend all hydraulic miners to employ no Chinese laborers.

#### The Speakers.

Hon. Niles Searles was then called for, and came forward. He delivered a very eloquent address to the assembled crowd, and stated in a most conservative and impressive manner how matters stand between the mining community and the Grangers. He said that every man in the mining community had a duty to perform, and that a united effort was all that will secure victory for their cause.

Mr. Skidmore, of the Miners' Association, was next called, and responded in a speech in which he gave important data concerning the cost of the mining suit, and the objects and actions of the Association.

C. W. Cross made some pointed remarks. He disapproved of "boy-cotting" by the miners in refusing to patronize the farmers, but thought the proper way to settle the difficulty was through the courts.

During the entire meeting the heat of order prevailed. The speakers were listened to attentively, and although the applauding was loud and enthusiastic, nothing of a hoisterous nature occurred. A band of music enlivened the meeting by rendering several selections during the evening. As a mass meeting, it was the highest ever held here, the number present being estimated at about 1,000.

### Production of Arizona.

The Tombstone *Epitaph* says: Arizona is so new a mining field that all doubts as to its stability are not yet removed from the minds of the great operators in San Francisco. These doubts are, however, in a rapid state of dissipation, owing to the continued favorable reports from all parts of the Territory. The monthly hullion shipments from the various paying mines are the solvents that will finally work an entire revolution in public sentiment in a quarter that has been the centre of the mining industry since inaugurated in 1849. When the last doubts shall have been removed, as we predict they will be within the next six months, as many eager investors from the Pacific metropolis will seek this field as ever did the world-famous Washoe and the White Pines of Nevada, then will begin an era of prosperity of which the present is but a faint prophecy. That Tombstone will remain the chief factor in the solution of this problem, as she thus far has been, there is little cause to doubt. All well posted mining men in and around this place concur in the opinion that present developments are merely superficial and do not reveal a tithe of the wealth that is stored up in the rock-ribbed hills in this vicinity. As it is, there is a healthy, steady increase in the monthly returns from the mines, which promises to be kept up until a million dollars will not more than cover them. The last month showed \$50,000 more than the preceding. When Empire, Girard, Sulphure, Flora Morrison and Ingersoll, all of which have large bodies of ore in sight, start upon regular reduction, it would be apparent that the present yield will be more than doubled. As it is, the output for the month of May makes a good showing for a camp little more than two years old. The aggregate foots up \$481,803, as against \$430,000 for the preceding month. At this rate of increase the month of June should give \$530,000. From the outlook now the production for the present year will fall little, if any, short of \$6,000,000, as against \$4,500,000 for the balance of the Territory. It is to such facts as these that we confidently look for removing the last lingering doubt in the minds of the San Francisco capitalists.

### Grid-Ironed.

The Territory of Arizona, which was, until quite recently, a stranger to railroads, is about to be grid-ironed by them. Two great through lines from ocean to ocean traverse the extreme south and north of the Territory. We hear of another line running to Guaymas. The Utah Southern is headed in this direction, and soon we may expect it within our borders. The Southern Pacific are about to commence another line from Mohave in California, and we predict it will be extended to the Colorado river, and thence to southern Arizona, connecting there with their line, taking in important mining camps in Mohave, Yavapai and Maricopa counties. Again, Prescott is to have a branch north, to connect with the Atlantic and Pacific. It is also probable that a road will be built from Prescott to Phoenix. Surely we are to live in a land of railroads, and for northern Arizona, Prescott will be the great center. —*Arizona Miner*.

### The Oleomargarine Wrong.

The Oleomargarine-abomination is still exciting Eastern producers of genuine dairy goods, and well it may, for the length, breadth and depth of the false product seems almost beyond measurement, and its future difficult to define. The State of New York, which is most grievously afflicted, has passed another law, which will come into effect next month, and which it is hoped will accomplish what the older law failed to do, and that is the enforcement of plain brands, etc., on oleomargarine products, so that they cannot be passed off upon unwary buyers for true butter and cheese.

The discussion of the new law in the New York Legislature brought to light numerous facts concerning the manufacture of oleomargarine which are new and should be generally known. It was thought when the oleomargarine processes were first mooted, that the specially fine calf fat which the specifications called for would be obtainable in too small amount to allow the manufacture to reach very high figures. It has been shown that this safeguard against the large increase of the false product was purely imaginary, for while the specifications called for calf fat, the process really employed almost anything in the form of tallow, and, it has been claimed, went even farther and took in other animal fats. This being the case, it is apparent how the production has grown in New York State so that about one-fifth of the whole State make of butter has been oleomargarine butter during the year 1880, or in round numbers about 20,000,000 lbs.

This immense amount of false butter was made last year. The greater part of it no doubt went to Europe, and some turned up last fall in California, where fortunately there is a strong feeling against it, both among dealers and consumers. Too much reliance, however, must not be placed upon general sentiment in this matter, for the profit in handling oleomargarine is great, and some one will be tempted by it. As soon as this season's make of butter begins to shrink, and the price reaches 35c, or even 30c, perhaps, then watch must be kept out for oleomargarine. We shall certainly keep an eye upon it or in search for it.

The possibilities of future production of this substance in New York City alone are appalling. As we have said, almost any tallow seems to be available. The number of heaves slaughtered in New York average 10,000 per week, or 520,000 per annum. Averaging 100 lbs. of offal fats per head, from which 35 to 40 lbs. of the oleo is extracted, which, by the addition of such inexpensive articles as milk and salt, increases the manufactured product by about 25%, and it will appear that a fair average yield of butter is about 45 lbs. per head. Multiply this by 520,000 head and we have the enormous product of 23,400,000 lbs. Allowing that one-fifth of the slaughtered heaves in the State occur in New York city, we have four-fifths to add to the above product to represent the possibilities of the entire State production, making the enormous aggregate of 116,000,000 lbs. of oleomargarine butter. The entire State production of genuine dairy butter in 1875, according to the census of that year, including all made in families as well as factories, amounted to only 111,018,413 lbs. So that the possible annual production of oleomargarine butter in this State may exceed by nearly 5,000,000 lbs. the actual make of genuine dairy butter. The same line of computation, if carried to other States, will make the possibilities of oleomargarine butter alone, far exceed the 1,500,000,000 lbs. of natural production in the dairy sections alone. But oleomargarine butter may be produced as well outside of the dairy regions, thereby doubling or even perhaps quadrupling the above figures, when the whole country is taken into the computation.

The effect which the career of oleomargarine has already had upon the legitimate product, was also outlined in the earnest speech made before the New York law makers by those who befriended the true dairy industry. Testimony was cited to the effect that the dairy interest is already injured to the extent of one-third its value, or between \$50,000,000 to \$200,000,000. What is the extent of the imitation interests that are bringing upon us these evil results? It is only claimed that about \$15,000,000 is invested in this imitation manufacture, as against \$4,000,000,000 to \$6,000,000,000 invested in the production of the legitimate product, and there are perhaps a few hundred people interested in the adulteration as against the five to eight millions interested in the unadulterated product. And yet the situation, as has been shown, is such as to forbid the ruin of the natural by the imitation industry.

It was this view of the matter which carried the new law in New York State, and in nearly if not all of the dairy States of the country. It is plain that this untrue product must not be allowed to wear the guise of the genuine, but must be known by its own wretched name. This we have law for, and all produce dealers and consumers should act together to make the law effective. The issue may be expected in this State this fall: how shall it be met?

ANCIENT TIMBER.—The ancient temples of Egypt are supposed to contain the oldest timber in the world, in the shape of dowel pins, which are incorporated with stone work, known to be not less than 4,000 years old. These dowel pins are thought to have been made from the tamarisk or shittim wood, in ancient times a sacred tree in Egypt, and now occasionally found in the valley of the Nile.

### Ancient Copper Mines.

The mining of copper ore is attracting a great deal of attention, and the eyes of capitalists are turning toward Arizona and New Mexico. A very interesting article appears in the *Albuquerque (New Mexico) Journal*, in describing the copper mines known as Santa Rita del Cores, located five miles east of Fort Bayard. These mines were discovered by an officer in the Spanish army, in 1800, who, not possessing means to work them, sold them out entire to a wealthy Spanish gentleman, in 1804, who commenced working the property extensively. His first shipment of copper to Mexico proved a success. On account of the extraordinary quality of the metal he was enabled to make a contract with the royal mint for the purpose of coinage for the full annual product of the mines. The copper was transported to the city of Mexico, 1,000 miles on pack mules to Chihuahua, from thence by wagon. One hundred mules were continually employed, each mule carrying 300 lbs. The force employed in working consisted of 390 men. It is claimed that the last year the mine was worked the proprietors cleared the net sum of \$500,000, and that the gold found in the copper paid all expenses. Notwithstanding a good title is vested in these mines, they have several times been jumped by prospectors. While the Santa Ritas are by very many considered the richest deposits of red oxide of copper known, they are strictly the most peculiar and really singular copper mines in the world. They are not veins or lodes; but on sinking a shaft, the miner continually meets with veins of native sheet copper from  $\frac{1}{2}$  of an inch to two inches thick all through the country or porphyry rock. He often meets with howler or nugget copper, in nuggets weighing from 50 lbs. to 150 lbs. These lumps are, on account of their peculiar formation, called by the miners kidney lumps. These mines, according to account, are inexhaustible, and bid fair to become more famous in the present day than they were in the past.

### The Miner as a Civilizer.

The following appreciative sketch is from the *Southern Utah Times*:

Much fault is often found with the miner, and perhaps not always without reason. But with all his faults he has one side to his history that all are forced to recognize, that is, that he is the harbinger of civilization. From the opening of spring to the close of summer, he is in constant migration, roaming from gulch to gulch and mountain to mountain in search of precious metals. Untiring of his peculiar industry, summer after summer he continues to penetrate the trackless regions of all countries in which metals of intrinsic value are found. He scales the loftiest peak in search of metal-bearing veins, and explores the lowest gulches in search of placer gold mines.

He fords and swims rivers that none but the bravest would encounter, often at the risk of his life. He is usually strong in body and of the most determined will. He is austere in manner, but has a generous, kind heart, and as a rule, he is the manliest of rough men. He is a sturdy, unpolished man, combining skill, judgment and courage in a degree sufficient to propel him through any journey he may undertake. If he succeeds in finding a mine that will justify him to remain and operate it, he is sure to stay, and every inhabitant of that certain section must leave or bend in obedience to his will.

His trail is followed by the farmer, the ranchman, the teamster, until every acre of arable land in the locality is reclaimed, and good roads to the El Dorado are made. Then follows the more polished and more solid elements of society, and the wilderness is in this way brought under cultivation, and enlightenment spreads and penetrates the remote interior of all countries through the efforts of the *prospecting miner*. The wealth of all countries is stimulated by his discoveries, and the foundation of new States laid. Therefore, the development of the immense area of the mineral regions—nearly one-third of the nation's domain—must be recognized as an important factor in the development of political institutions, and to the explorer of metals is due the beginning.

Left to all other sources and influences, the "valleys in the mountains" would for centuries remain homes for the savage and the wild beasts. For without the discovery of mines in the surrounding mountains, no market could be found for the products which would make limited fertile valleys profitable to an agricultural community. The political importance of the explorer for precious metals is well worthy of close study and attention. The other side of his life, however, will show that he is not a close student, and his demands are consequently at times extraordinary.

CURIOUS PROPERTIES OF MAGNETIC IRON.—A curious magnetic property of the meteoric iron of Santa Catarina (Brazil), has been lately observed by Prof. Lawrence Smith, of Louisville. Small detached fragments, not weighing more than 0.1 to 0.5 gr., were very weakly affected by a magnet; but on being flattened on a piece of steel with a steel hammer, they became very sensitive to it. By heating red hot, the particles were made to be still more easily attracted than by flattening. The meteoric iron in question contains 66 iron, 34 nickel.



## THE ENGINEER.

## Brick Foundations.

Trautwine, who has experimented considerably with building materials, says on this point that a rather soft brick will crush under a weight of from 450 to 500 lbs. per square inch, or about 30 to 40 tons per square ft., while a first-rate machine-pressed brick will require from 300 to 400 tons per square ft. This last is about the crushing limit of the best sandstone—two-thirds as much as the best granites or roofing slates. But the masses of brickwork he notes, will crush under smaller loads than the single bricks. In some English experiments, referred to by this author, small cubical masses only nine inches on each edge, laid in cement, only two days after being built, required 44 to 62 tons per square ft. to crush them. Another, of pressed brick, in best Portland cement, is said to have withstood 202 tons per square ft., and with common lime mortar only one-fourth as much.

The same authority, however, is careful to add the statement that cracking and splitting usually commences under about one-half the crushing loads. To be safe, he recommends that the load should not exceed one-eighth or one-tenth of the crushing load; and so also with stone. Moreover, he notes, these experiments were made with low masses, but the strength decreases as the proportion of the height to thickness increases. He cites the following examples: The pressure on the base of a brick shot tower in Baltimore, 246 ft. high, is estimated at 63 tons per square ft., and in a brick chimney at Glasgow, Scotland, 468 ft. high, at 9 tons. Prof. Rankin calculates that in heavy gales this pressure is increased to 15 tons on the leeward side. The walls of both are, of course, much thicker at the bottom than at the top. With walls 100 ft. high, of uniform thickness, the pressure at the base would be 5.4-10ths tons per square ft. He prudently concludes that with our present imperfect knowledge on this subject it cannot be considered safe to expose even first-class pressed brickwork, in cement, to more than 12 or 15 tons per square ft., and good hand-molded bricks to more than two-thirds as much.

**TO SECURE GOOD COMBUSTION.**—1. The gas must be thoroughly burned. This can be secured only by burning it with hot air and in a red-hot chamber. Therefore the air for burning the gas must be heated in some way before it enters the boiler furnace, and there should be a hot fire-brick combustion chamber separate from the boiler, so that its temperature may not be reduced by contiguity of the comparatively cold surface of the plates of the boiler. 2. The temperature in the boiler furnace must be the highest possible attainable by the combustion of the waste gases. This requires not only complete combustion, but the absence of an excess of air. 3. The heat produced by this combustion should all be absorbed by the water in the boiler, except barely a sufficient amount to heat the escaping gases to the temperature required for draught. These conditions are exactly those required for the best results in boilers heated by solid fuel, but we think they are entirely overlooked at many furnaces. We have seen the draught stack of a nest of steam boilers red hot at night and a long column of flames steadily emerging from the top. The furnace at which this took place was using about two tons of fuel (coke) to the ton of iron.—*American Engineer.*

**MEAN VELOCITY IN OPEN WATER COURSES.**—The discharge of open water courses may be found experimentally by observing the velocity of the current, and measuring the cross-sectional area of the stream. But to do this correctly, we require the mean velocity throughout the section, which cannot be obtained by observation. The velocity varies, being a maximum at the surface, and where the channel is deepest, which is usually near the center of the width, diminishing from thence to the banks on either side and to the bottom, where it is a minimum. The best experiments we have, give the mean velocity throughout the section at 84% of the maximum central surface velocity, which is usually the velocity observed, being easily obtained by a float on the surface of the stream. Thus, if a channel has, by observation, a central surface velocity of 35 ft. per minute, the mean velocity will be 29.4 ft.

**TUNNELING MONT BLANC.**—The project of tunneling Mont Blanc bids fair to assume a tangible shape, it being pronounced by some of the most eminent French engineers a more practicable undertaking than that of the Simplon route. The estimates of cost for executing such a work are, in the case of the Simplon, \$27,000,000, and in that of Mont Blanc some \$12,000,000 less. It is further claimed that the Mont Blanc tunnel will make the journey from Paris to Genoa some 97 kilometers shorter, and from Paris to Milan 44 kilometers shorter than by the Simplon route. The most favored line of the projected tunnel thus far in the discussion, is from Chamounix to Courmayeur.

**SOLAR HEAT.**—M. Pifre, a French engineer, has so far improved on the apparatus invented by M. Mouchot, for using the solar heat-rays for practical purposes, that he states he obtains 80% of the available sun's heat in Paris, which is equivalent to a gain of 30% in efficiency.

## USEFUL INFORMATION.

## Luminous Paint.

## Its Philosophy and Practical Application.

It appears that luminous paint is gradually working its way into practical use. Dr. Morton, of New York, recently delivered a lecture upon the subject, in that city, which is reported in the *New York World* as follows:

The lecture was accompanied by some curious experiments with sulphide of calcium paint. Dr. Morton said that while heat, to become luminous, must be made very intense, phosphorus emits light with very little heat. Phosphorescence is a purely chemical action, but there is a class of phosphorescents that do not depend on chemical action. The means of producing light are both mechanical and chemical. Thus, the blacksmith, as he strikes the iron, produces first the long bent waves, the vibrations growing gradually shorter until a white heat results. But the long waves continue to vibrate at the same time with the shorter light ripples. With phosphors, the higher wavelets can be produced without beginning with the long waves. Sulphate of quinino and other substances have the power of taking short rays while they emit longer waves. They do not store up the light, but emit it in 1-500th part of a second. Phosphorescent bodies do not act in so short spaces, but emit a somewhat larger wave. Bodies have been manufactured which will continue the emission for a very long time. When light falls on phosphorescent bodies, it effects a molecular change and thus stores up energy. When the light is emitted, the molecules fall back into their natural place and develop energy also. In the case of sulphide of calcium heat is the agent that develops this energy. It is made by heating sulphur and lime together. It has been so improved in manufacture that it now emits light for hours.

Dr. Morton then exhibited a plate of glass painted over with sulphide of calcium, the hall being darkened for the purpose. It gave a very clear, bluish light. He said that a window thus coated would light up a room during the night, while it would be transparent during the day. A painted lantern was shown which could be taken around without any need to recur to matches. A star cut out of pasteboard on a canvas coated with the paint appeared perfectly black, while the canvas gave forth the peculiar bluish-white light. A tin globe painted with the sulphide, and magical sign-boards which gave out the letters on them or exposed a dazzling white surface, according as the room was darkened or not, excited the admiration of the audience. A bust, the hair and toga of which were painted, while the face and breast were not, was very pretty, the face and breast, being yellow, gradually getting darker, while the robe was a dazzling white. Dr. Morton said he could make his way easily through a dark cellar by its aid. There is, of course, no danger of fire. He said he looked forward to the time when the use of the sulphide of calcium would obviate a great many dangers to which miners and others are exposed.

## Luminous Paint in England.

An English journal, *Design and Work*, gives the following account of some interesting demonstrations of the practical uses to which this paint may be applied. We quote as follows: Messrs. Illies & Horne, of London, sent us an invitation to see their luminous room, which we accepted. This room, in the ordinary state, is perfectly dark. The ceiling, however, has been painted with three coats of Balmains' luminous paint, which, when exposed to the ordinary light of day, collects and retains a surprising amount of light.

Upon entering into this room the appearance is that of a pale moonlight, in which the various objects were distinctly visible. It was very difficult at first to persuade one's self that the light was merely emanating from the ceiling, and that it was not due to some leakage of light from outside. This was, however, tested by failing to observe any shadow, which would have been shown had the light made its way from without. Around the room, hung upon its wall, and standing upon a large table in its center, were various objects which one has, more or less to look for in the dark. Among these was a life buoy, which shed a halo of peculiar violet white light, a clock dial showing the hands and figures very plainly, a luminous match box, a statuette, all of which, with many others, had received a coating of this extraordinary compound.

The words "Caution," "Beware of the Dog," "Lodgings," "Mind the Hatchway," and several other sentences appeared with marvelous distinctness, having been painted with the luminous compound.

Just outside the luminous room was another from which all light was excluded, but not painted with anything save the ordinary paint and whitewash, so that there was nothing visible in the blackness. Into this room was brought a large frame square of glass, the back of which had received several coats of luminous paint, which rendered the room luminous to see what was going on, to tell the time by a watch, the names of books on the book-shelf, and other details too numerous to mention.

The paint is of a whitish cream color, and is made in two ways—as a water paint, or white-wash for ceilings, walls, etc., and as an ordinary stone color oil paint, for use in the ordinary way.

## AN IMPORTANT INVENTION—COATING TIN.

**PLATES WITH GLASS.**—The great danger of suffering from the effects of certain chemical actions taking place between the acids and salts in the substances packed in cans and the tin in the plates from which cans are made, will soon be removed, if the following described invention can be made practicable. It is stated in an English paper that a firm at Dunstable provides receptacles made of plates faced with a material which interposes a film between the surface of the metal and the fruit or other contents. The insoluble portion of this composition is silicate of lime or fluo-silicate of lime (glass-powder), previously acted on by fluoric acid; the soluble portion being silicate of soda and potash. Preferably that kind of silicate of lime is used which has been procured by double decomposition from polysulphide of calcium, chloride of calcium and hydrate of lime; or there may be used a silicate of the earthy bases or metals, or precipitated gelatinous silica. The alkali may be fixed or removed by a both containing a dilute solution of fluo-silicic acid, when fluoric acid has not been used, or a dilute solution of any other suitable acid. To make the composition mix the soluble with the insoluble silicate in equal proportions, although these may be varied according to the consistency required. The plates are coated with the mixture by a brush or by dipping into a bath. After coating, the plates are dried by heat, and are ready for manufacture. This invention furnishes a plate with a surface somewhat resembling glass, but without the aid of fusion; and this coating cannot be separated from the metal, which may be bent or worked in any manner desired.

**MEASURING BUILDING MATERIAL.**—The following figures are worth remembering, as they will save a great deal of calculation and give approximately accurate results with a minimum of labor: A cord of stone, three bushels of lime and a cubic yard of sand will lay 100 cu. ft. of wall. Five courses of brick will lay one ft. in height in a chimney. Nine bricks in a course will make a flue 8 in. wide and 20 in. long, and eight bricks in a course will make a flue 8 in. wide and 16 in. long. Eight bush. of good lime 16 bush. of sand and one bush. of hair will make enough mortar to plaster 100 sq. yds. One-fifth more siding and flooring is needed than the number of square feet of surface to be covered, because of the lap in the siding, and matching of the floor. One thousand lathes will cover 70 yds. of surface, and 11 lbs. of lath nails will nail them on. One thousand shingles laid four in. to the weather, will cover over 100 sq. ft. of surface, and five lbs. of shingle nails will fasten them on.

## GOOD HEALTH.

## The Uses and Abuses of Glucose.

Dr. Kedzie, President of the Michigan State Board of Health, contributes to the *Bulletin* of the National Board of Health a valuable paper on the adulteration of food, in the course of which he exposes the practice of substituting glucose, the sugar of the grape, or that made from starch, for cane sugar, which has two or three times the sweetening power of glucose. One gallon of syrup made from sugar cane, he writes, has more sweetening than four gallons of glucose syrup. If glucose syrup sells for 100 cents a gallon, glucose should sell for 24 cents to represent the money cost by an equivalent value in sweetness. The comparative cheapness of glucose naturally induces the suspicion that it is largely used to adulterate cane sugars, but he has not found such to be the case.

Grape sugar does not crystallize readily, nor in forms identical with the sharp, clearly defined crystals of cane sugar. "I have analyzed a large number of 'granulated,' 'crushed' and 'powdered' sugars without finding glucose in a single instance." In brown coffee sugars, however, he has detected glucose, but not in heavy proportion. In the common candies, where the crystalline form is avoided purposely, glucose is often used in large quantities. In the table syrups—sugar-house, golden and silver "drips," rock candy drips, etc.—the substitution of starch for cane sugar is very general. The average proportion of glucose in nine specimens of these commercial forms of molasses was about 90%. An outrageous use of glucose syrup is that of feeding bees upon it in order to increase the yield of "honey." Not only is extracted honey largely adulterated with glucose syrup, but the honey in the comb frequently consists of little else than syrup of glucose.

Bees gather honey from flowers, but do not make it. If we feed them on starch or cane sugar, excluding other food, they will simply fill their combs with syrup, not honey. This substitution of starch sugar in place of honey is a shameless fraud, and imperils an important industry—bee farming. A very promising foreign demand for honey will soon stop unless this fraud is prevented. Congress ought to pass a law to protect the bee-keepers and the honey-eaters. It may not have power to prevent persons feeding glucose to their bees, but it can compel them to label their honey for just what it is, or send them to prison for obtaining money under false pretenses, if they sell such stuff for honey.

## Lungs Filled with Iron.

A singular post-mortem discovery was recently made at Fulton, N. Y., in the case of a long suffering machinist. The case was that of Joseph Bausel, whose post-mortem examination, according to the *New York Sun*, developed a phenomenon which surprised the doctors, and has been the theme of considerable medical speculation. Bausel, who was 48 years old, was a native of Wales, and in boyhood was apprenticed to the trade of machinist and loom-fixer, which he followed in various factories in Wales and England before he came to this country 13 years ago to set up the machinery in the Oswego Falls factories, opposite this place, on the Oswego river. The machinery was of English invention, and required an expert to adjust it. Bausel was an excellent workman, and was given constant employment here at his trade, which involved the adjusting of machinery by filing the joints to make them fit smoothly. He had an extraordinary amount of this work to do, for the reason that the managers of the Oswego Falls factories here have constantly been putting in new machinery, and extending their mills.

At the post-mortem examination, it was observed that the upper surfaces of the lungs had a strangely mottled appearance. On closer examination it was found that it was covered with iron or steel filings, embedded in the tissue. On the under side of the lungs there was no trace of filings. A quantity of dark-colored blood was found in the stomach, the mucous membrane of which was engorged, and the heart was greatly enlarged with ossifications as large as the end of the thumb, on the mitral valve.

When the metal filings on the lungs were discovered, one of the physicians remarked that they showed clearly what the man's occupation had been. The doctors say that other persons similarly engaged are likely to become similarly affected by inhaling steel and iron filings, and that the deposit on the lungs might, and probably would, be fatal, especially if the pulmonary organs were not strong, or the man exceptionally robust. Paralysis and enlargement of the heart complicated the case of Bausel, and resulted in his death. The examination was not carried far enough to determine the amount of the metal filings embedded in the lungs.

**PHYSIOLOGICAL ACTION OF SALTS OF GOLD AND OTHER METALS.**—A very remarkable series of observations has been made by Dr. James Blake, concerning the physiological action resulting from solutions of different salts when introduced into the blood of living animals. He finds that salts of the same isomorphous group produce an intensity of physiological action in proportion to their atomic weights. For instance, the salts of thorium, palladium, platinum, osmium and gold showed great similarity in their physiological action, all of them having a decided and characteristic effect on the heart. The action of gold compounds was surprising; in minute doses of 0.003 gramme per kilo, it kept up the action of the heart for several hours after death, though the temperature of the body had fallen 13° below the normal heat.

**SPANKING AND FLOGGING AS THERAPEUTIC MEASURES.**—A year or two ago Dr. I. E. Taylor showed the excellent effects to be derived from spanking the child and flogging the mother (with a wet towel), in some of the accidents of parturition. Dr. Heurot, of Paris, has found the same measure admirable as a remedy in hysterical spasms. We recollect that, as a small boy, we took some doses of this same preparation for certain emotional diseases, such as slight kleptomania (toward apples), acute ira, and disorder of the organs of speech (prophasia); in these and similar disorders, we join in giving our fullest recommendation.—*Phila. Med. and Surg. Reporter.*

**ON THE CAUSES OF LEPROSY.**—Dr. Jonathan Hutchinson, in the *Press and Circular*, says: "We find that nearly everywhere the disease is most common on the seashore, and that when it spreads inland it generally occurs on the shores of lakes, or along the course of large rivers; we find also that fish is largely eaten where leprosy prevails. I don't believe that any other article of diet has any influence whatever on the causation of the disease; this is so special in its character that it must have one special cause."

**NEW REMEDY FOR PARASITES.**—Physicians are often troubled to give relief to the symptom of itching which so frequently forms a prominent feature in certain skin diseases, and the most varied local measures are often used with the result of aggravating the local irritation. The list of internal remedies used for allaying this distressing condition is a limited one, and from it chloral and bromide of potassium stand out almost alone; but the objections to the continued use of these are too obvious to require mention.

**KISSING IN DIPHTHERIA.**—The late Princess Alice, oldest daughter of Queen Victoria, and wife of an Austrian prince, lost her life a year or two ago through a kiss. Two of her children died of diphtheria, and she could not resist the entreaties of her dying boy to "kiss mamma;" she kissed his paling lips in an agony of motherly love, and took the dread disease, which resulted fatally.





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## Passing Events.

Since the last issue of the PRESS the hydraulic miners have held a meeting and expressed their opinion on the debris question in a series of resolutions, which we publish in another column. A fire entailing a loss of \$250,000 has occurred at Tombstone, Arizona, mainly in the business portion of the town. Most of the dwellings and a good many of the business houses were either adobe or built of board and canvas—balloon frames—and, of course, burned rapidly. Our copious mining summary will give a good idea of the situation in the various mining localities.

We close volume XLII this week, and it is just as well to bear in mind that this is a good time to renew subscriptions, and for new subscribers to end in their names.

The week has seen the culmination of the grand celestial phenomena which have given timid people occasion for much ecstatic worrying. On Sunday morning many persons went to church with the fear that some exquisite cataclysm might occur before they returned to their homes. They were doomed to disappointment for the appointed hour for the conjunction of the great planets came and went, and the little earth wiggled along through space, apparently unmindful of the peculiar position into which the other members of the planetary family had come.

BEAUTIFUL LEAVES.—Let the tourist in California mountains, during a bright May or June day, lounge upon Mother Earth's back (and his own back) under a newly-leaved oak and observe the leaves which happen to come singly between his vision and the sun. They will appear as if made of transparent wax, with delicate veins and velvet edges tipped with shining silver.

## Close of the Volume.

With this number is concluded Volume XLII of the MINING AND SCIENTIFIC PRESS, and the paper may, therefore, be said to have attained its majority, this being its 21st birthday. Twenty-one years is a very long time anywhere, but especially in the life of a Pacific coast newspaper. The PRESS may consider itself one of the firmly fixed features of California, and is a pioneer in every sense of the word. Especially does it pride itself in being the pioneer of the mining journals of the country, in view of the fact that there are now so many of them, and that the mining industry has come to the front as one of the leading industries of the nation.

We may be supposed, after so many years, to have acquired some experience in the management of a mining journal, since this paper has, with the exception of the first year, been under the management of the same proprietors during all these years. For ten years past its editors have been the same. We see the same mistakes in mining matters repeated by the new comers, and take occasion repeatedly to warn them of the pitfalls which lie in their way, and which our experience points out. If this advice is not heeded it is no fault of ours.

We have aimed, with the advance of years, to have the PRESS show a material advancement, and we think we have done so. The index, on the last page of this number, will show the scope of the contents of the paper for the past six months. It will speak for us more plainly than anything else.

It is customary on such occasions as this to remind our readers that this is a good time to subscribe, but as we have followed this custom many years, we will not do it this time for a change.

## Caution and Counsel to the California Miner.

Excited by the speciose allurements of Arizona, Wood River, and other outside districts, there is danger just now that many California miners be enticed to pull up stakes and leave the State for what may seem to them more promising localities. That some may improve their prospects and, perhaps, finally their fortunes, by emigrating to these new fields of enterprise, we are not disposed to question. Whether this be or not, certain it is that to the veteran prospector, and that class of restless wanderers that follow close in his wake, it would be useless to address words of either caution or advice. To remain where they are, and settle down to steady hard work, making the most of their opportunities and surroundings, is a thing no one expects them to do. The disposition to roll up their blankets and strike out for the site of the last new thing in the way of a mining excitement, has with them become chronic and incurable—a sort of second nature, that must stay with them to the end.

That the gratification of this passion has kept the most of these men poor; that it has rendered them homeless and homeless, converted them into waifs drifting on the tide of events, buffeted by every wind of chance, signifies not. The "Wandering Jew" was not more fated to continue his endless journeyings than are these nomads to get up and skurry away when first the rumor of mineral discoveries made afar off reaches their ears. Consigning to their destiny these irreclaimable tramps, let us address a few words of counsel to that class of miners who have not yet fallen into this roving habit, or with whom it has not, at least, become fixed and irrepressible.

In the first place, then, when tempted to leave California for any of these remote and much bewitched discoveries let the staid and thoughtful miner consider how, almost always, the importance of these reputed new finds is grossly, not to say shamefully exaggerated, the story of their extent and richness arising often from misapprehension and ignorance, or being the villainous fabrication of interested parties. Never have the first reports of these discoveries been subsequently verified, the most of them, as is quite notorious, having had no foundation whatever in fact. In so far as any benefit ever accrued to the masses who left California for Frazier river, Washoe, or any other localities outside her borders, every one of these movements may be pronounced dead failures, not one man in a hundred of those who were carried away by these excitement but would have been better off had he remained where he was. Let the miner who contemplates a journey to any of these outside places ponder well this significant fact.

Then there arises to the man who remains and pursues his calling in a neighborhood where he is acquainted, this advantage; he not only saves his time and money, but he is pretty sure to earn something. Making available his knowledge of the diggings, he can hardly fail to earn enough to pay his way and a little more. This the stamper does not always do; on the contrary, he is apt to spend what he had and return to his old home "dead broke." Seventy per cent. of his kind come back from their campaigns in a worse plight than the Prodigal Son—out their expenses and incontinent "strapped." In this we have another phase of the question for a prudent man to ponder.

Again, California is a pleasant, healthful con-

try for a man to live in. Even if he does not make so much money, he can enjoy life here and otherwise get a great deal more out of it than is possible in these sage brush, alkali lands with their cloud-bursts, sand-storms; and their siroccos, their brigands and blizzards. As regards health, this State is a vast sanitarium, in which men, but for their bad habits or inherited disease, would live until old age. Bare existence amounts to something in a country and a climate like this. Better live here, under the wide-spreading boughs of an umbrageous oak, than in a palace almost anywhere else. And are not the mining regions the most desirable places of abode in all this broad and delectable land? Is there another such place for the homes of white men as these foothills of the Sierra, with their salubrious atmosphere, their magnificent rivers, stately forests, rich, red soil and their gold? Not another in all the world. Go where you will—traverse the face of the earth over and you will not find it like.

And let the California miner think of this, too, and stopping where he is, let him take up some land, inclose, plant and cultivate it, and make there a home. While doing this, it will be an easy matter to secure also some mining interests near by. And, certainly, these are things to be looked after. If not very valuable now, they will be by-and-by. Quartz veins that possess no value to-day will, with the improvements that are being made, be worth a good deal in the course of a few years. Our advice to miners, therefore, is that they take up these properties and hold on to them. A gold mine will, after a while, be a handy thing to have on the premises.

Nor are the remnants of the placer diggings thing to be despised. There will come for them, too, a day of regeneration—not swift, but slow and sure. There is much gold to be gathered yet in the California placers; and, with the new aids to be introduced, it will be done with such profit as will encourage thousands to again engage in the business. Many of the old bars and gulches will be gone over once more; the tailings that encumber the canyons and streams will be reworked; the river beds will be drained and worked—possibly dredged out, notwithstanding the failure that have thus far attended trials with machines of this kind. The low grade gravel banks will be hydraulized or otherwise disposed of, and the deep-lying channels of the ancient rivers will be opened up and drifted out. While some portions of this forward movement will be deferred, much of it will be the work of the early future.

To the waiters and toilers in our own mines, we would say, then, stop in California; abide where you are; take up mines and stay by them; get land; own, beautify and plant it. This will be better than a pilgrimage to Tombstone, Yankee Fork or Wood River, even if you could be assured that it would be attended with much more than the average success.

## Notes on Roscoelite.

[Written for the PRESS by HENRY G. HANES, State Mineralogist.]

Roscoelite is a new and extremely rare mineral found in El Dorado county, California.

Attention was first called to it by the reading of a paper by Dr. James Blake, at a meeting of the San Francisco Microscopic Society, July 2, 1874. The specimen then exhibited were from a mine or claim, known as the "Stuck-slayer," "Plum Tree," or "Sam Simms" mine, which lies in section 24, township 11 north, and range 9 east, Mount Diablo base and meridian; somewhat more than a mile from the town of Coloma, in a southwest direction.

At a meeting of the California Academy of Sciences, held on July 20, 1874, Dr. Blake presented specimens of the same mineral, which he then supposed to be a chromium mica, having in a preliminary examination found, as he supposed, chromic acid combined with silica, potash and lithium. Gold was also associated with the mineral in considerable quantities. He stated that it was found at Granite creek, near Coloma, El Dorado county, remarking at the same time that the associated minerals were an interesting and beautiful microscopic study, and that the formation indicated that the gold must have been deposited between the flakes of the mica from an aqueous solution. He gave the new mineral the provisional name of "Colomite," from the locality.

The next notice appears in the proceedings of the California Academy of Sciences, Vol. 6, 1875, folio 150. At a meeting held August 2d of that year, Dr. Blake read a paper on "Roscoelite"—a new mineral, in which he admitted that he had stated at a former meeting that the mineral contained a large quantity of chromic acid, an opinion derived from the results of superficial blow-pipe tests. He had since sent samples to Dr. Genth, of Philadelphia, who found it to contain vanadium. He had given the name Roscoelite as a compliment to Prof. Roscoe, of Manchester, England, who has made vanadium a special study. In a foot-note, Dr. Blake expresses the opinion that vanadium may occur in these rocks in larger quantities than is generally supposed; and calls attention to the fact that Dr. Hall has found it widely diffused in many rocks.

The vein from which the Roscoelite was taken is small and not continuous, varying from two inches to a foot in thickness, running nearly parallel with Granite creek.

The quartz is ferruginous in appearance, and is associated with calcite and slaty matter, and

at least two varieties of pyrites. Gold only occurs with the Roscoelite, and usually in parts of the vein where the quartz disappears, or "pinches out," as the miners express it.

Roscoelite was for a long time a mystery to the miners and was at first mistaken for plumbago. The pioneer placer miners on "Big Red Ravine" used to complain of the difficulty of saving the gold, owing to the interferences of the "black stuff," as they designated it. In all probability a large quantity of gold was allowed to escape from ignorance of the nature of this mineral.

Gold is found interstratified with lamina of Roscoelite, or imbedded in it, in pieces from the value of one dollar, to the minutest microscopic particles.

The method of operation at the mine has been to remove superficial slaty covering by ground sluicing, and carefully working the small but exceedingly rich material found in this pay-seam. From one pan of this, 40 ozs. of gold has been taken; from another, good to the value of \$100 was obtained. The fineness of the gold is 846.

Under the microscope Roscoelite is seen to be in scales and radiated tufts, the luster of which is silvery or pearly to a high degree—almost metallic by strong reflected light; color, light steel gray, yellowish dark green, or nearly black, as seen in different lights. Small deeply striated crystals of white iron pyrites are sometimes seen on freshly broken surfaces of quartz, partly imbedded. The quartz in actual contact with Roscoelite is generally transparent and nearly colorless; sometimes rose colored or amethystine. Although rather common in the ores, pyrites has not been observed in contact with Roscoelite.

When magnified 70 diameters, Roscoelite resembles the variety of pyrophyllite found at Greaser gulch, Mariposa county. As far as observed the associated gold is always bright, of good color and amorphous, generally rounded as if water worn.

The other mineral associates of Roscoelite are calcite, and a yellow mineral, which is probably marcasite or chalcophyllite, found only in microscopic quantities.

The only other known locality of Roscoelite in the State, is section 31, township 11 north, and range 10 east, two miles from the Sam Simms mine. Big Red Ravine is on this section, lying only two miles from the site of Sutter's mill, where gold was first discovered. It was one of the earliest placer mines known in the State, and so rich did it prove, that it has paid to re-work as many as seven times. It is in the bedrock of these old workings that Roscoelite is found.

I am indebted to Mr. George W. Kimble, surveyor of El Dorado county, for valuable information and for specimens of this rare and interesting mineral—with him I walked over the ground while he pointed out the localities—the largest mass found here was taken out by a Chinaman and is described as having been as large as a gallon measure. From first to last 400 to 500 lbs. of Roscoelite have been obtained all of which was wasted in extracting the gold.

I was only able to obtain for the State Museum a thin piece of quartz of a few inches superficial surface, coated on both sides with Roscoelite; some large masses showing the mineral in spots, and some beautiful microscopical specimens containing gold.

At the Red Ravine locality, Roscoelite is found in a dark colored bluish micaceous rock in small seams of quartz and calcite with gold. This rock has not yet been studied.

Through the politeness of Mr. James Taylor, of Owen's College, Manchester, Eng., I have been furnished with the following analyses of Roscoelite:

Analysis of Roscoelite by Prof. H. E. Roscoe, of Owen's College, Manchester, Eng.:

Silica.....	41.25
Vanadic Acid (V, 2; G, 5).....	23.80
Alumina.....	12.84
Sesquioxide of Iron.....	1.13
Oxide of Manganese (Mn, 3; O, 4).....	1.10
Lime.....	.61
Magnesia.....	2.61
Potash.....	3.56
Soda.....	2.01
Water combined.....	1.08
Moisture.....	2.27

Total.....100.27

Analysis of Roscoelite by F. A. Genth, of the Laboratory of the University of Pennsylvania:

Silica.....	47.69
Oxide of Vanadium (V, 6; O, 11).....	22.03
Alumina.....	14.10
Peroxide of Iron.....	1.67
Magnesia.....	2.00
Potash.....	7.59
Soda.....	.13
Insoluble Silica, Quartz and Gold.....	.83
Loss on Ignition.....	4.96
Lime and Lithium, Traces.....	—

Total.....101.02

OTTAWA, Ont., experienced a slight shock of earthquake recently, causing considerable terror.

A SIX-YEAR-OLD girl who was kidnapped in San Francisco several months since was recovered at a place on Puget Sound and returned to her mother.

SERIOUS trouble exists between the Mexican States of Durango and Coahuila, and the former has been invaded by an armed body of men.

ANDREA LA CHAPPELLE died at Portland, Or., recently aged 100 years, having resided on the coast since 1817.

COL. ROBERT G. INGERSOLL is said to have become a millionaire through investments in New Mexico mines.



## The Great South Dome, Yosemite Valley.

(Written by G. H. S.)

In 1874, Prof. Whitney wrote as follows: "The Half or South Dome is a crest of granite rising to the height of 5,000 ft. above the valley, seeming perfectly inaccessible, and being the only one of all the prominent points about the Yosemite which never has been and perhaps never will be trodden by human foot."

A close examination of this elevation shows that the prophecy would appear to be warranted. The valley front is a smooth, nearly vertical flat wall, which gives the name Half Dome. The remainder approaches an oval dome shape, falling off rapidly from the top to 60°, 70°, 80°, and nearly vertical as it goes down toward the valley, and these sides are from 2,000 to 4,000 ft. high, except at the rear side, nearly opposite the flat front face. On this side it is approached to within about 2,000 ft. by a comparatively easy trail, which diverges some distance above the Nevada fall, from the trail to Cloud's Rest. Upon leaving the woods, the Dome becomes visible for the first time. The first elevation is called "The Saddle." It is a steep narrow ridge, sloping down rapidly to each side, and is very steep upon the ridge itself, but there are many large rocks, some crevices, and an occasional scrubby pine bush by which to hold on until this ascent has been overcome.

Then comes a depression, or saddle, between its highest point and the dome, and this also slopes off, as its name indicates, so as to leave but a narrow standing room in the center. From this point the curved slope of the dome commences, and extends 900 ft. to the top. The actual angle is from 38° to 40°, and in some places possibly a little greater, which does not seem very steep when laid out on paper, but when it is in the form of a smooth granite rock, and has, in addition, a slope upon each side, it is had enough to look up to, and is extremely trying to the nerves to look down at, unless they are pretty steady. The layers of rocks on the sides are in the form of shells, overlapping downward like shingles; whenever there are any breaks, these form steps of from one to two ft. high, which must also be surmounted while ascending the incline. This defeated all attempts which were ever made to climb this rock, until October, 1875, when Mr. Geo. G. Anderson succeeded, after two days and a half, in accomplishing the ascent. Mr. Anderson is a Scotchman, who has resided in the valley for 15 years. He is a ship carpenter by trade, and had followed the sea in that business for many years before settling on shore. Before his residence in the valley, he was engaged in putting up one or two suspension bridges over the Tuolumne and other rivers, and acquired considerable local fame for fearlessness and steadiness of nerve. After determining to try the ascent of the dome, he prepared eye-bolts, drills, chisels, and the necessary ropes, and packed them to a convenient place, and after much hard work he reached the top, and planted a flagstaff there. Since that time quite a number of men, and some ladies have climbed the dome, and have been repaid for the risk by the grandest view in the valley.

Last year the rope became unsafe, and was out to prevent any further attempts and possible accidents. All this excited my interest, and when Anderson offered to accompany me to the Saddle, which he said was as far as we could go, I eagerly accepted the invitation, and this morning, accompanied by a friend, we started at seven o'clock, passing the Vernal Fall, and climbing the steep, narrow trail which surmounts the Nevada Fall, we followed a comparatively easy path toward Cloud's Rest, until we reached a point where we turned off and commenced the ascent toward the Dome. All of this portion of the trail leads through the forest, crossing little streams and some rocks, until we pass the oahin where Anderson lived and prepared the iron work and bolts for his attempts, a picture of which is given on this page. At this season of the year we find many of the peculiar, beautiful snow plants just starting from the ground all along the trail; but as we ascend, these disappear, and the trees become smaller, and finally disappear just at the foot of the Saddle. When we emerged from the timber and caught the first glimpse of the Dome and the Saddle, it appeared like an almost vertical wall of smooth rock and impossible to scale.

At this height one easily becomes short of breath, and must make frequent stops to recover the breath. We climbed the projecting spur of the Saddle, with considerable difficulty, and took a long rest upon the comparatively flat surface at the top of this elevation. Two hundred and fifty ft. or more above us dangled the frayed and ragged end of the rope which had been broken at that point, and after extending, with one or two breaks, some 400 or 500 ft. upward, it again terminated, and apparently where it would be most needed.

I had made up my mind before starting that, if possible, I would attempt the ascent, but dared not speak of it to Anderson, fearing that he would not allow it, and when we first came in sight of the place my courage became exceedingly weak, and I was glad that I had not spoken of my intentions to anyone.

After resting a short time, however, I tried to go up a little way, but my boots slipped upon the rocks so that I felt convinced that I could not get up with them on. I then sat down and took off boots and stockings and slung them over my arm for use when I should

reach the top, if I ever did. From this point the slope was too steep for the sharp granite sand to lie upon it, and the rock being perfectly smooth, my bare feet would hold upon it so that I could climb with but little difficulty.

Anderson now seemed to divine my intention, for he came up to me and, after gathering a few of the bolts which had been pulled out and were lying at the foot upon the Saddle, and se-

throw a stone into it, but almost a mile vertically below us, was Mirror lake, while down the valley all the familiar points seemed but a little distance away, but very small. The Cap of Liberty, Mt. Broderick, North Dome, Glacier and Eagle points are all far below us, but in the opposite direction Starr King, Cloud's Rest, Dana, Hoffman and many others tower still farther above us. Near the farther



CLIMBING THE SOUTH DOME, YOSEMITE.

lecting some of the best of the pieces of rope which were still lying there, to repair with, we started up, putting in a bolt here and there, and making the rope fast, for it was almost entirely loose from the point

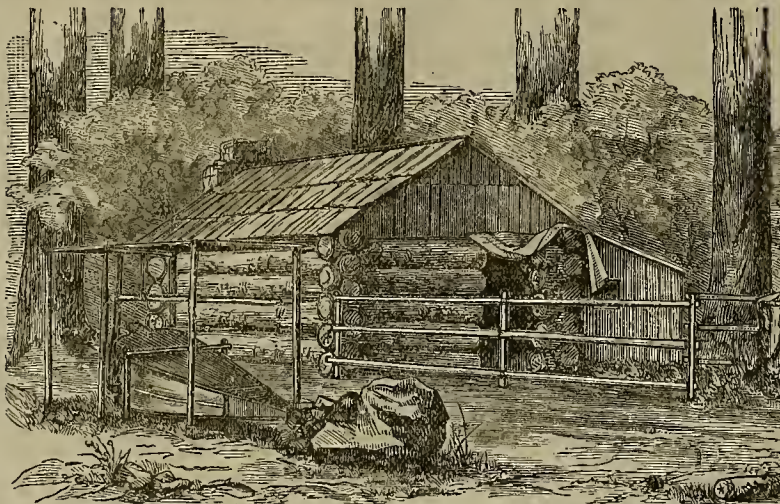
d of the flat vertical face of the Dome the layers of rock project over. From this point rocks thrown off were 21 seconds by the watch before striking, or rather before the sound came back to us, but it was impossible for me to



SOUTH DOME, YOSEMITE—RESTING ON THE SLOPE.

where it commenced, to its upper end. We added some rope at the lower end, and worked slowly up, not trusting the rope, as it was very weak in many places. Before we had accomplished half the ascent, the clouds which

appreciate the great height. Standing upon this projecting point within a foot of the edge, I did not feel the height much more than I would that of the Palace hotel when looking from the parapet. About 100 ft. back from the face of



ANDERSON'S CABIN, BACK OF SOUTH DOME, YOSEMITE VALLEY.

had been threatening all the forenoon, began to close in around us, and finally a sharp wind began to blow and some flakes of snow and hail to fall, we therefore abandoned the rope and went up the remainder of the distance as fast as we could. At the top I resumed my shoes, as there is nearly 15 acres of comparatively level space there, and at this time there was a large body of snow upon one portion of it. We found the flagstaff fallen down, and set it up, and then the clouds broke away a little and gave us a magnificent view of the valley. Just under our feet, and apparently so near that we could

the rock there is a fissure from 8 to 15 inches in width and this extends for some hundreds of ft., one end running out to the face; the other I did not see. We threw small stones down this fissure and they rattled down from side to side for nine seconds before they found a resting place. This crack is estimated to be from 600 to 800 ft. deep, and if the mass of rock hounded by it is ever detached, it will terminate the existence of the present Mirror lake. We had hardly completed half our hurried inspection when the clouds began to close in around us again.

## Calistoga and Lake County.

The picturesquely situated town of Calistoga is "holding its own and better" at present. It is the terminus of the Napa Valley branch of the C. P. R. R. A large amount of merchandise and other freight is distributed here for mines and towns in Lake county and other interior places. Wool, sulphur and quicksilver are among the products received for San Francisco. Numerous tourists and campers visit this town on their way to Clear Lake and the famous watering places in Lake county. The route via Mt. St. Helena affords many delightful views, and scenery, scarcely less grand and pleasing than that of the Sierra. The hotels are now well patronized.

## The Calistoga Hot Springs.

Eleven of the cottages surrounding the Hot Springs hotel, kept by Col. A. C. Tichenor, have been "made over new," and put in improved order this season, and present a comfortable and home-like appearance. The warm swimming baths are an enjoyable feature. Natural steam and hot sulphur baths are furnished free to guests. The burning gas well is a rare curiosity. Simply an inverted sheet iron tank, about 18 inches deep by 24 in diameter, placed over the well, with two gas burners attached, gathers sufficient gas to give a continuous flame eight inches or more in length. The quality and appearance of the flame is peculiarly different from that of any gas we have ever noticed, and seems worthy of the investigation of our scientists. A large tract of the surrounding fields seems underlaid with steaming hot mineral waters, which find vent through numerous springs. In what might be termed a partially evergreen meadow (which pastures the cows that furnish fresh dairy supplies for the hotel), volumes of steam are to be seen on a cold morning rising up in many different places. Twenty-eight date palm trees, mostly about three ft. in diameter, form a striking feature of the ornamental grounds. They spread their "injun-like" top-knot from 18 to 25 ft. high, reaching above the highest parts of the neat cottages that they were planted for decorating some 15 years ago. A fine growth of elms and other thrifty trees make up a handsome grove. An abundant supply of fresh water is secured to the place, derived from the near hills almost bordering Calistoga on three sides. The place has peculiarly interesting features for the observation of visitors and tourists. Sam. Brannan founded and improved this resort at an expense of over \$200,000, or nearly a quarter of a million. The hotel is located near to and in sight of the railroad depot.

Passing Brannan's great failure and the Colonel's "huge joke" (as some people consider it) concerning the wonderful gold-bearing qualities of the hot spring water, it is safe to say the place has rare advantages that are likely to give it great prominence as a favorite resort for certain months during all four of the seasons. Fisher's Clear Lake and Calistoga Stage Line.

Mr. W. F. Fisher, the proprietor, has the headquarters of this important line of stages at his Lodi stables in the central business portion of Calistoga. He is a practical stage man and has been active in the business about 25 years in Napa and Lake counties. His enterprise is an important business feature of the place and was established over six years ago. He is well credited for employing able and careful drivers, good stock and safe vehicles, and has been fortunate as regards accidents. Good time is made with much regularity over his routes.

His coaches leave Calistoga Tuesdays, Thursdays and Saturdays, for Lakeport, via St. Helena Mountain Toll House, Middletown, Cobb valley, Glenbrook and Keelseyville, returning on alternate days. Connections are made on this route with the Great Western and Oat Hill quicksilver mines; the Anderson, Adams, Siegler, Highland, Allen, Wittier, Pierson and Bartlett springs, Soda Bay and other steamer points on Clear lake. Mondays, Wednesdays and Fridays coaches leave for Sulphur Banks (on the east shore of Clear lake), following the same route to Middletown, and thence via Guenoc and Lower Lake, making connection with Howard and Siegler springs and the steamer on Clear lake. A new graded road will in a few weeks be finished from Bartlett springs to Sulphur Banks, forming new and important connections with this route. Passengers now leave San Francisco at 8 A. M., and reach Lakeport and Sulphur Banks early in the evening, in less than 11 hours from the city, carrying the U. S. mail and Wells, Fargo & Co.'s express.

Fisher's stages connect at Lakeport and Keelseyville with W. C. Van Arman's Cloverdale, Lakeport & Bartlett Springs line. The entire routes of these stages abound in grand and picturesque scenery and natural wonders.

Foster's stages leave Calistoga daily for the celebrated Geysers and other parts of Sonoma county.

There are pleasant drives over good roads about Calistoga, and a greenness and freshness of trees and plants that remind one at this season somewhat of Eastern fields and meadows.

THE dividend of the Ontario mine, Utah, paid on the 15th, amounted to \$75,000. It was the 63th dividend of this mine, aggregating in all the snug sum of \$3,500,000.

It is now estimated that fully 2,000 men are engaged on the Denver & Rio Grande road in Utah.



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Dated at San Francisco this First day of April, 1881.  
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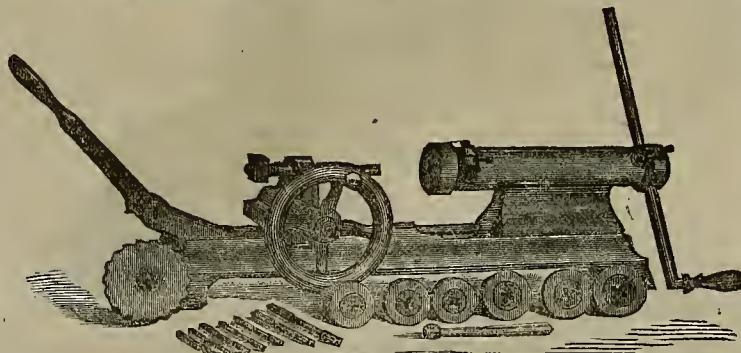
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E. W. ROBERTS, Superintendent.  
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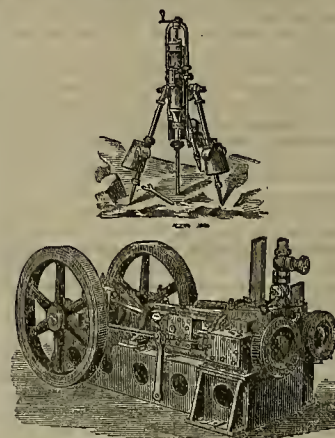
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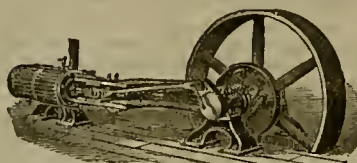
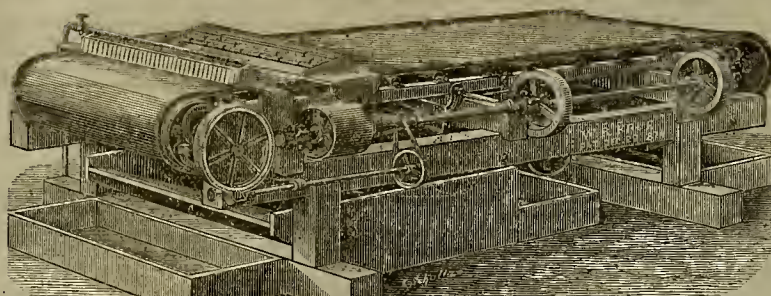
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Fair for 1880 of the Mechanics' Institute of San Francisco, Cal.Saves from 50 to 100 per cent. more than any other Concentrator in use, and the concentrations are clean from  
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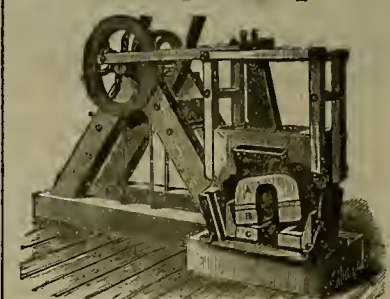
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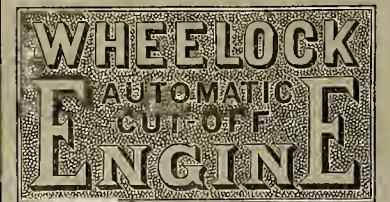
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## PATENTS AND INVENTIONS.

### List of U. S. Patents for Pacific Coast Inventors.

From Official Reports for the "Mining and Scientific Press," U. S. and Foreign Patent Agents.

FOR THE WEEK ENDING JUNE 14, 1881.

242,738.—DOOR CHECK.—Isaac N. Arment, Dayton, Washington Territory.  
242,868.—HEADER.—J. W. Blewin, Yuba City, Cal.  
243,893.—NITRO DEXTRENE.—O. S. Dean, S. F.  
242,928.—THRUST BEARING FOR PROPELLER SHAFTS.—John Oordon, S. F.  
242,941.—SOPA BED.—F. Laerebans, S. F.  
242,850.—RAILWAY CROSS TIE.—Hans Thielson, Walla Walla, W. T.  
243,015.—HYDRAULIC BORING APPARATUS.—Vaughn & Vincent, Stockton, Cal.  
242,922.—DOOR KNOB ATTACHMENT.—Adam Good, S. F.  
242,776.—BILLIARD CHALK HOLDER.—L. E. Holmes, Woodland, Cal.  
242,746.—SAFETY CADE.—C. D. Brown, Prescott, A. T.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEXTER & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast Inventors transacted with perfect security and in the shortest possible time.

### Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign, Patent Agency, the following are worthy of special mention:

**HYDRAULIC BORING APPARATUS.**—Walter W. Vaughn & George Vincent, San Francisco. Assignor one-half to Asa Clark, of Stockton, and Caleh Doreey, Oakdale, Cal. Dated June 14th. No. 243,015. This invention relates to a hydraulic boring or sinking apparatus, the principle of which is to employ the pressure of water upon the bottom of the pipe to force it into the ground, so that they are enabled to work the pipes or casings for artesian wells by means of a power applied to the bottom of the pipe instead of the top. It consists of an upright framework of posts or pillars supporting the shaft, and fly-wheel operating a series of force pumps, whereby the pressure of water is obtained. An upright, stationary hollow pipe, supported by steady dogs fastened to the pillars, is fastened to the nozzle of the pump pressure-chamber and extends to the ground. Fitting around this hollow pipe is a hydraulic pipe, to the upper end of which a stuffing box and collar is screwed, while to the lower end is screwed a solid metal point, having a steel tip to penetrate the earth. The upper end of this point presents a resisting surface to the water which is forced down through the central stationary pipe. Around this hydraulic pipe fits another pipe, or outside casing, the top of which fits under the collar of the stuffing box, and is pressed down by it. This outside casing, or pipe, extends about half way down the point, and has a flange, or collar, on which a corresponding projection on the point rests. The supporting framework or pillars are braced and strengthened by truss braces and anchor rods, and appropriate pawls support the pipe when hoisting. But the hydraulic pipe and the outside casing pipe are forced down outside the stationary pipe, and are forced into the ground their entire length, after which another length of each may be screwed on and forced down; and when the well or hole is of the required depth, the hydraulic pipe with its point is hoisted out, leaving the outside casing in the ground.

**BILLIARD CHALK HOLDERS.**—Lyle B. Holmes, Woodland, Yolo county. Dated June 14, 1881. No. 242,776. This is a novel device for holding the chalk which is used for billiard cues. The holder is so adjusted that the chalk may be easily brought to the point where it is to be used, and then returned to a position where it will be out of the way. The chalk holder is attached to a cord having a counter-poise or weight, so when the user lets go the handle or holder it will fly back to its place beside the table. A spring in the holder forces the chalk forward as it wears away.

**NITRO-DEXTRENE.**—Gilbert S. Dean, S. F. Dated June 14, 1881. No. 242,893. The object of this invention is the preparation of a new variety of nitro-dextreine. Briefly stated, the manner of its accomplishment consists in treating vegetable fiber with dilute acid whereby its structure is destroyed and dextrination commences, and afterward nitrating the same with cold nitro-sulphuric acid. We shall more fully describe this patent in a future number of the PRESS.

**HEADER.**—J. W. Blewin, Yuba City, Cal. Assignor one-half to J. E. Dempsey, same place. Dated June 14, 1881. No. 242,868. This invention relates to certain improvements in that class of machines for cutting grain and delivering into wagons, known as headers, and consists in certain details of construction and operation, and certain combinations, which improve the header materially, but which it would be very difficult to describe without the aid of suitable engravings.

### News in Brief.

EX-GOVERNOR THOS. L. YOUNG, of Ohio, is en route to California.

ANOTHER batch of discoveries in connection with the star-trover frauds is published.

WILLIAM SHAW drowned himself at Tuceon, A. T., yesterday.

FROST is playing havoc with vegetables at Quebec, Canada.

DEOOLIA's sawmill, near Grass Valley, was destroyed by fire Thursday night.

THE Sunday law was again closely observed in Marysville Sunday.

A CHINAMAN has been ordained at Portland, Or., as a minister in the Baptist Church.

A FIRM at South Bend, W. T., has been fined \$500 for cutting timber on Government land.

TEN eunstrokes, six of them fatal, have occurred at New Orleans since Thursday.

ANOTHER version of the New Testament is to be issued, to be known as the "The American Version."

A FURIOUS and damaging storm swept over a portion of northern Ohio on the night of the 17th inst.

THE Fenians charged with attempting to blow up the Town Hall were committed for trial at Liverpool Saturday.

DURING the 11 months ending May let, the exports of breadstuffs from this country amounted to \$244,955,370.

SERIOUS riots between the French and Italians occurred Sunday at Marseilles, but quiet was finally restored.

A FRIGHTFUL explosion of giant powder occurred at Centerville, near Shasta, demolishing a store and badly injuring the proprietor.

A MAN at Ottawa, Ont., is building an ark and stocking it with provisions, in anticipation of a flood.

WHILE shearing sheep at Antelope, Or., the shears were kicked by a sheep into the side of Frank Driver, killing him immediately.

AT San Diego the railroad company are constructing a huge water-tank, to hold 90,000 gallons.

IMPROVEMENTS of a vast nature are being made in the great National park, in the Yellowstone valley.

THE population of Victoria, B. C., exclusive of Indians, is 6,364, and of the province, about 25,000.

ON Sunday, of last week, the water in patches of a hundred or more yards square, about Tillamook rock light, was black with small fish, upon which millions of birds flocked to feast.

A BARN containing 150 tons of hay, belonging to W. D. Ashley, 10 miles northeast of Stockton, was destroyed by fire Tuesday night. The loss is estimated at \$2,500. No insurance.

TEN more Nihilists have been sentenced at Kief, Russia, to penal servitude, among them four women. The Czar of Russia still keeps himself a close prisoner in his palace, and is said to be a complete wreck.

AS late as 10 days ago there was a heavy fall of snow in several localities of Montana. People call that Territory a good summer country, but such weather as is indicated, enowstorms in June, seems rather too much for the average Pacific Coast man.

THE Gridley Herald is responsible for the story that a sand-hill crane, which was killed near that place recently, was not less than 98 years old. A wire was found around the bird's neck, suspended from which was a silver quarter-dollar, bearing this inscription: "Captured at Fort Du Quesne, May 25, 1873." "Released at Fort Dearbourne November 17, 1846."

THE N. Y. Times has a story from Batavia, N. Y., which town is filled with excitement over the discovery of what are believed to be the remains of Wm. Morgan, the man who betrayed the secrets of the Free Masons in his book entitled "More Mean Illustrations of Masonry," 55 years ago, and was abducted and made away with before the work was given to the public.

A CONSOLIDATION has been effected of the Utah Central, Utah Southern and Utah Extension railroads. Jay Gould, Sydney Dillon, John Sharp and other capitalists connected with the Union Pacific are directors in the new company. The entire line will hereafter be known by the name of the Utah Central. It extends from Ogden to Frisco, a distance of 280 miles, and the probability is that the line will be extended southward to make railway connection in Arizona.

SELF-ADJUSTING BERTHS for steamship use appear to be coming into practical use. It is said that the steamships of the Inman line to Liverpool are to be fitted with a self-adjusting bed, which accommodates itself to every motion, fore and aft and on the beam, which it is possible for a ship at sea to make. The old universal joint contrivance which proved a failure has been disregarded and the principle applied in compass swinging has taken its place in this new invention. The berth occupies only one inch more space than the ordinary stationary berth. The head and foot of the berth are set in a circle of wheels so as to allow the side motion of 30°, and by an arrangement of armatures, a pitch of five inches is allowed. In a steamer 450 ft. long the maximum pitch, by actual test and observation, is only 2½ inches to 6 ft., and the greatest side motion ever observed was 22°, so that the pendulum of this berth is far beyond anything it is ever likely to be tested for.

### Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. F. OSORNS.—San Francisco.  
A. C. KNOX.—Napa and Lake counties.  
O. W. MCGRAW.—Santa Clara county.  
M. P. OWEN.—Santa Cruz county.  
J. W. A. WRIGHT.—Maricopa, Tulare and Kern counties.  
JACK C. HOAG.—California.  
B. W. CROWELL.—Yuba and Sutter counties.  
D. W. KELLER.—Solano and Sacramento counties.  
GEO. W. FAHRION.—Plumas county.  
GEO. H. HOPKINS.—Amador county.  
A. LEONARD MYER.—Utah and Idaho Ter.

IMPORTANT additions are being continually made in Woodward's Gardens. The grove walls d with acacia is constantly receiving accessions of new fish and other marine life. The number of sea lions is increased and there is a better chance to study their actions. The pavilion has new varieties of performance. The floral department is resplendent and the wild animals in good view. A day at Woodward's Gardens is a day well spent.

PERSONS receiving a sample copy of the MINING AND SCIENTIFIC PRESS with this notice marked, are requested to examine the merits of the same, and consider fairly its claims for support, and if consistent, subscribe for the paper through the P. M. or agent delivering it, or otherwise. We will send it, on trial, at the rate of \$4 per annum for any period the reader may wish. Please notice our terms elsewhere, and if desired, send for further samples and information. Those who can circulate this No. further to our advantage are invited to do so.

HOW TO STOP THIS PAPER.—It is not a difficult task to stop this paper. Notify the publishers by letter. If it comes beyond the time desired you can depend upon it we do not know that the subscriber wants it stopped. So be sure and send us notice by letter.

BOUND VOLUMES OF THE PRESS.—We have a few sets of the back files of the MINING AND SCIENTIFIC PRESS, which we will sell for \$3 per (half-yearly) volume. In cloth and leather binding, \$5. These volumes, complete, are scarce and valuable for future reference and library use.

SAMPLE COPIES.—Occasionally we send copies of this paper to persons who we believe would be benefited by subscribing for it, or willing to assist us in extending its circulation. We call the attention of such to our prospectus, terms of subscription, etc., and request that they circulate the copy sent.

THE State Mining Bureau, No. 213 Pine street, is open to the public from 10 o'clock A. M. to 5 o'clock P. M. daily, (Sundays excepted). Henry G. Hanks, State Mineralogist.

BY TELEPHONE.—Subscribers, advertisers and other persons wishing to address orders, or make appointments with the proprietors or agents by telephone, as we are connected with the central system in San Francisco.

## Mining and Other Companies.

Persons interested in incorporated shares will do well to recommend the publication of the official notices of their companies in this paper, as the cheapest appropriate medium for the same.

### REGULAR DIVIDEND NOTICE.

OFFICE OF

Northern Belle Mill & Mining Company,

SAN FRANCISCO, JUNE 10, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 46), of Fifty (50) Cents per share, was declared, payable on Wednesday, June 15, 1881. Transfer books closed on Saturday, June 11, 1881, at 12 o'clock M.

WM. WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

### EXTRA DIVIDEND NOTICE.

OFFICE OF

Northern Belle Mill & Mining Company,

SAN FRANCISCO, CAL., JUNE 10, 1881.

At a meeting of the Board of Directors of the above-named Company, held this day, an Extra Dividend (No. 47), of Twenty-five (25) Cents per share, was declared, payable on WEDNESDAY, June 15, 1881. Transfer books closed on SATURDAY, June 11, 1881, at 12 M.

WM. WILLIS, Secretary.

Office—Room No. 29, Nevada Block, No. 309 Montgomery street, San Francisco, Cal.

### DIVIDEND NOTICE.

OFFICE OF THE

EUREKA CONSOLIDATED MINING CO.

Nevada Block, Room 37, San Francisco, June 15, 1881

At a meeting of the Board of Directors of the above-named Company, held this day a Dividend (No. 68), of Fifty (50) cents per share was declared payable on Monday, June 20, 1881. Transfer books closed until the 21st instant.

W. W. TRAYLOR, Secretary.

### ANNUAL MEETING.

The annual meeting of the Stockholders and Directors of the Warren Powder Co. will be held at 2 o'clock on Tuesday, June 28th inst., at the office of the Company, 24 Merchants' Exchange. GUSTAVE FRANK, Sec'y. San Francisco, June 14, 1881.

### ANNUAL MEETING.

GOVER MILLING AND MINING COMPANY.—The regular Annual Meeting of the Stockholders, for the election of a Board of Directors, will be held on Tuesday, June 14th, 1881, at 2 o'clock, P. M., at the office of the Company, No. 402 Front street, Room 8, San Francisco, California. W. O. WILSON, Secretary.

### Steep Hollow Gold Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Liberty Hill Mining District, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 21st day of June, 1881, an assessment (No. 6), of \$1.50 per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, No. 310 Pine street, Rooms 15 and 17, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 26th day of July, 1881, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on Thursday, the 18th day of August, 1881, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. W. PEW, Secretary.

Office—310 Pine St., Rooms 15 and 17, San Francisco, Cal.

### Wolverine Gravel Mining Company.

Location and principal place of business, San Francisco, California. Location of works, Roach Hill, Placer county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the Thirty-first (31) day of May, 1881, an assessment, No. Two (2) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately to the Secretary, at the office of the Company, No. 325 Front Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the First (1) day of July, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the First (1) day of August, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

E. J. BLANDING, Secretary.

Office, No. 325 Front Street, San Francisco, Cal.

### Arizona Mexican Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Globe District, Arizona.

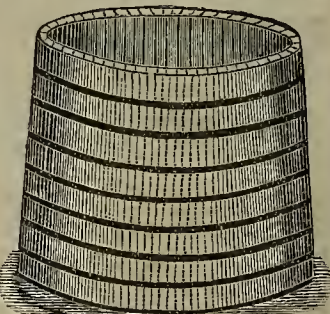
Notice is hereby given, that at a meeting of the Directors, held on the 7th day of June, 1881, an assessment (No. 1), of Fifty (50) Cents per share was levied upon the capital stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary at the office of the Company, Room 39, No. 320 Sansome St., San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of July, 1881, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 5th day of August, 1881, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. R. ADAMS, Secretary.

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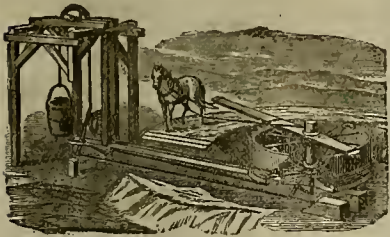
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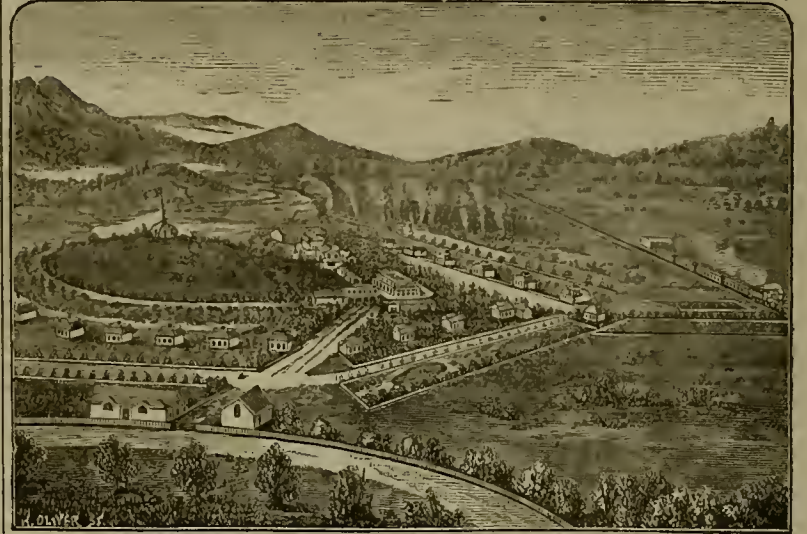
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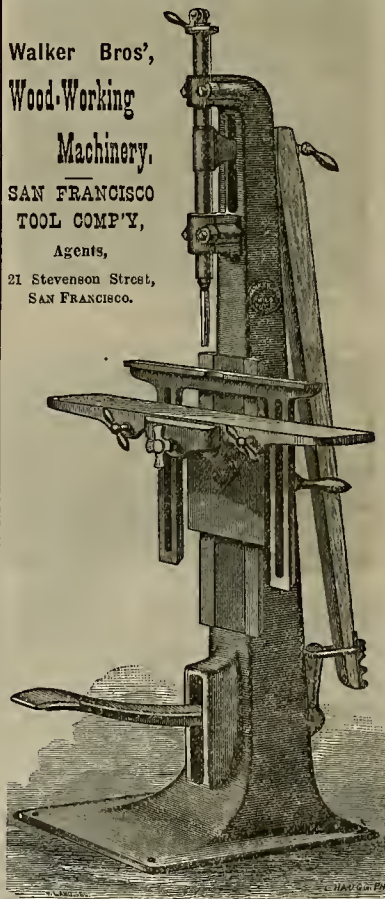
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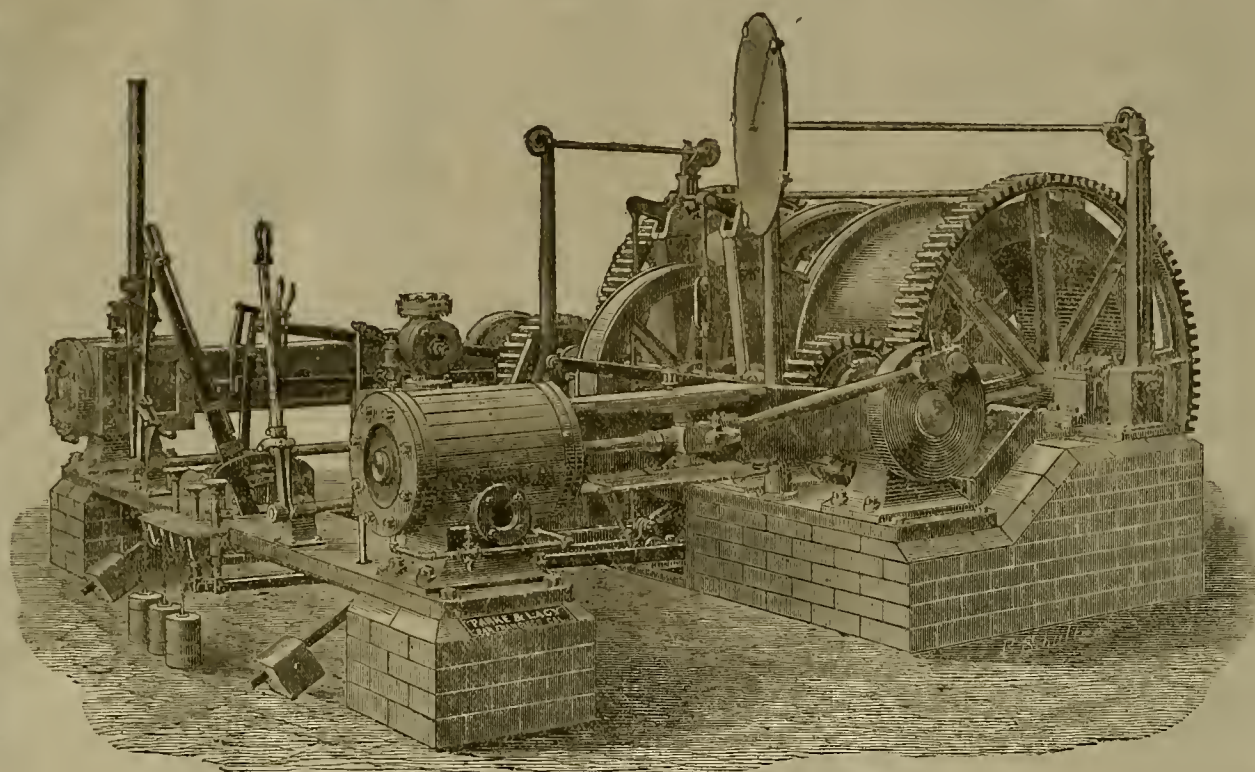
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Special Commission of Mines; Member of the  
Committee on Mines at the Congress of Na-  
tions held in St. Petersburg, Russia;  
Mining Commissioner for the United  
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-OF THE-

## Mining and Scientific Press

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